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Duxbury (Dana) and Associates, Andover, MA

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PROCEEDINGS OF THE FOURTH NATIONAL CONFERENCE ON HOUSEHOLD HAZARDOUS WASTE MANAGEMENT

NOVEMBER 6-8, 1989

ORLANDO, FLORIDA

Sponsored by
U.S. Environmental Protection Agency

Conference Managed
by
Dana Duxbury & Associates
and
GRCDA

Proceedings Prepared by
Dana Duxbury & Associates
16 Haverhill Street, Andover, MA 01810
February 1990

DANA DUXBURY & ASSOCIATES

Dana Duxbury & Associates (DD&A) was established in 1988 to tackle waste management problems. DD&A specializes in integrated solid and hazardous waste management, pollution prevention, recycling and household hazardous waste management (HHWM) issues.

DD&A provides policy, planning, research, technical assistance, facilitation and educational expertise on solid and hazardous waste management to government, industry and public interest group clients.

GRCDA

GRCDA is an association of solid waste management professionals which provides a vehicle for information exchange among those in the solid waste management field.

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U.S. ENVIRONMENTAL PROTECTION AGENCY

HOUSEHOLD HAZARDOUS WASTE MANAGEMENT CONFERENCE

NOVEMBER 6-8, 1989 ORLANDO, FLORIDA

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Jack Maynard
Director of Communications
Florida Department of Environmental Regulation
To
EPA Conference on Household Hazardous Waste Management

I want to welcome you on behalf of Governor Bob Martinez and Secretary Dale Twachtmann of the Department of Environmental Regulation. I probably also should mention the Florida State Seminoles, the Florida Gators, and the Miami Hurricanes--and I don't want to forget Mickey Mouse and Shamu the Killer Whale.

I hope all of you enjoy your stay in Florida and in the Orlando area -- and when you go back to your homes, I hope you will decide to return soon, and to bring your family and friends with you.

Governor Martinez asks that you accept his apologies for not being here with you today. Last week, he had to go to Key West to investigate a situation you may have read about -- the grounding of the freighter on our priceless and irreplaceable coral reefs near John Pennekamp State Park and again, the grounding of another freighter off the Dry Tortugas. Both of theses incidents illustrate the need to move shipping lanes further to the east -- something Governor Martinez had been fighting for even before these incidents.

Obviously, these events, along with the special session of the Legislature next week, have created a great deal of difficulty in the Governor's schedule, but he sends his best wishes for a useful and productive session here.

There's a maxim, 'Tell me and I will forget; teach me and I will remember, involve me and I will learn.'

I know most of you are familiar with Florida's Amnesty Days program. We are particularly proud of this program because it is one that clearly illustrates what that maxim is talking about. With this program, our citizens become directly involved in protecting the environment from the possible harm cause by household hazardous waste. Already Florida's second round of

Amnesty Days is on a schedule that will collect three times as much household hazardous wastes as was collect in the first Amnesty Days a few years ago.

Of all the programs that I, as Communications Director for the Department of Environmental Regulation am involved with, I have to rate the Amnesty Days program at the top, or very close to it. This program is so successful because it makes Florida's citizens aware of the results of improper handling of household and other hazardous wastes. They also are directly involved in protecting their environment from these products, while learning about their harmful effects on the environment, and on people.

I want to mention another program we are proud of--the Hazardous Waste Collection Center Grant Program, which is set up to turn the responsibility for collecting hazardous waste over to local governments and to offer a permanent location where local citizens can dispose of their hazardous waste.

We think this program has gotten off to a great start, and feel it represents the essence of what we are trying to accomplish. It is important to note that both Amnesty Days and the grants program depend upon each other--one cannot be effective without the other.

I won't give you a lot of 'gee whiz' figures today, because I know that you are the experts in that area. But I do have one interesting piece of information that I would like to pass along--maybe you can use it later on in the programs here.

Last year, according to the Department of Environmental Regulation, some 11 million gallons of used motor oil was unaccounted for and apparently went into the environment somewhere in Florida. The most interesting thing about that figure is that it is approximately the same amount spilled by the Exxon Valdez up in Alaska.

I think that our goal, therefore, is to try to somehow generate the same amount and type of media coverage to the used motor oil and all other hazardous wastes that are being improperly disposed of as the media gave to the Exxon Valdez. Granted that was an environmental disaster. But used motor oil, as we all know, is itself a more harmful product than the type of oil spilled by the Valdez.

Years ago, a song came out that I really liked. The title was "We Are The Champions" Well, I am here this morning to tell you that you are the champions! On your shoulders falls the burden of insuring a safe and healthy life for our future generations. What you do now will determine how they will live then. It has been said that we are the past's future, and the future's past. That illustrates how important it is for each one of us to assume our responsibility, so we don't look back in the future and say we didn't do all that we could.

I spend much of my days talking to reporters from Florida's media as well as from media throughout the nation. And I am more convinced than ever that the decade of the 90s will be the decade of the environment. Never before in history has so much emphasis been placed on any one topic. And I think it is justified, because if the environment is not handled properly as an issue then all our other issues will become irrelevant because we won't have anything left.

I want to thank you all again for coming to Florida. Have a fantastic time while you are here. Have a great meeting, and come back real soon.

Thank you very much.

KEYNOTE SPEECH: FOURTH ANNUAL CONFERENCE ON HOUSEHOLD HAZARDOUS WASTE

Jeffery Denit, Deputy Director
Office of Solid Waste

I. Introduction

I'd like to welcome you all to the Fourth Annual Conference on Household Hazardous Waste (HHW) Management. I'm very pleased to be here today to speak with you about what EPA feels is an important component of solid and hazardous waste management - the reduction and safe and effective management of household hazardous waste.

Household hazardous waste falls into a unique category in the Agency's scheme of waste management. Because household hazardous waste is exempted from federal hazardous waste management standards under Subtitle C of RCRA, and because the majority of states have also adopted this exemption, much household hazardous waste is disposed of in municipal landfills or incinerators, along with other municipal solid waste.

The quantity of this HHW is significant. Recent data show:

- The average home contains 50 to 100 pounds of accumulated household hazardous waste.
- Household hazardous waste makes up approximately 1% of the 160 million tons of solid waste generated by the United States each year - or 1.6 million tons.

These figures indicate that the quantity of HHW entering our municipal solid waste stream may unnecessarily have a significant impact both on existing landfill capacity and the safe management of hazardous materials. Hopefully, these statistics will decrease as the number of successful HHW collection programs increase.

II. Purpose of Meeting

Last year, it was apparent at our conference that a tremendous amount of progress in HHW collection had been made over the last decade, particularly in the areas of increasing numbers of collection programs and in consumer education. We also discussed activity on RCRA reauthorization, activity which has increased with the introduction over the year of a large number of House and Senate RCRA reauthorization bills.

As I'll discuss later, legislation being considered by Congress addresses ways we can reduce and better manage both hazardous and solid wastes.

This year's conference emphasizes some familiar topics and delves into some new areas, including:

- **Toxicity reduction** and **recycling**;
- **Special waste streams** of concern, including used oil and lead-acid batteries;
- Comprehensive household hazardous waste management **education programs** - getting the word out about risks and about the safe handling of household hazardous waste through proper management and disposal; and
- Expanding and improving **existing household hazardous waste collection programs** and beginning **new programs**.

Those of you here today represent a broad cross section of concerns in the field of household hazardous waste management, representing private firms, federal agencies, local public agencies, environmental and citizen groups, and state and territorial waste management programs. Together, our goals over the next few days will be:

1. To offer practical knowledge to communities setting up or running their own household hazardous waste management and collection programs, and
2. To serve as a forum for the exchange of ideas on how to better respond to challenges in this area.

I anticipate that the following days will result in an impressive and very useful dialogue.

III. Pollution Prevention and Household Hazardous Waste Management

A. Expanded Agency Emphasis on Prevention

Until the last few years, national efforts were focused on the problems of managing hazardous waste. With the passage of the Resource Conservation and Recovery Act of 1976, EPA was directed to establish a national hazardous waste management program that focused on solid waste management from "cradle-tograve", or from the waste's point of creation to its final disposition. In 1980, legislation was passed in the form of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), also known as Superfund, that addressed the result of improper disposal of hazardous wastes that were found to have resulted in a number of hazardous sites across the country. This campaign of hazardous waste management consisted of two components:

1. Abating problems that already existed, and
2. Implementing a strong program of prevention of future problems through comprehensive waste management regulations.

In the area of municipal solid waste management, we will soon be finalizing revised standards for municipal landfills which will provide for design, location, and operational criteria and will include groundwater monitoring and corrective action requirements. Although sound waste management and clean-up are essential, in the last few years, the Agency has expanded its focus on the prevention of pollution.

B. Pollution Prevention Policy

The policy articulated by EPA over the past 2 1/2 years has been to eliminate the generation of waste wherever possible. With the issuance of the proposed Pollution Prevention Policy Statement in the January 26, 1989 Federal Register, the Agency committed itself to encouraging pollution prevention as an ethic within EPA, other Federal agencies, and in all sectors of society. The policy's goal is to prevent pollution before it becomes a problem. EPA intends to accomplish that goal by reducing or eliminating discharges to the environment at the source to the extent possible, and secondarily, by promoting environmentally sound recycling of materials. The newly established Pollution Prevention Office will be the focal point for coordinating pollution prevention Agency-wide among EPA's program offices. As I'll discuss, within EPA's Municipal Solid Waste Program, we have several efforts underway to promote the pollution prevention ethic for municipal waste.

C. National Goals as Stated in the Agenda for Action

As you know, the Agency published the Solid Waste Dilemma: An Agenda for Action in February of this year. This document states our national strategy for addressing the solid waste crisis. The Agenda sets out a number of national goals which form a hierarchy of solid waste management, with source reduction at the top of the list. Some of the goals set by the Agenda are to:

- Achieve 25 percent source reduction and recycling by 1992;
- Reverse the trend of increased waste generation;
- Improve solid waste management practices; and finally to
- Have sufficient capacity in landfills, municipal waste combustors, and secondary markets to handle whatever waste is left.

D. Municipal Solid Waste Program's Focus on Pollution Prevention as It Pertains to Household Hazardous Waste

The Agenda's goals encompass the management of all solid waste, but EPA's Municipal Solid Waste Program is undertaking a number of activities that directly affect household hazardous waste management. A special focus of the Program is **source reduction,** the key component of pollution prevention. Source reduction involves reducing the volume/amount of waste and reducing the toxicity of waste that is generated and must be managed. Source reduction includes designing products for extended use and ease of repair, using reusables over their disposable counterparts, and substituting nontoxic for toxic materials in product formulations. Overall, source reduction calls for a change in attitude, where concerned citizens, industries, and organizations pay attention to and take responsibility for decisions that affect the environment. Industry can play a role by reformulating products to contain fewer toxics and considering the end life of their products in the design and manufacturing stages. Source reduction is an important theme of this conference, and will be discussed at greater length in a session led off by Mike Flynn this afternoon.

Specific activities the Municipal Solid Waste Program is undertaking in the area of toxicity and source reduction, include evaluating toxic components of the MSW waste stream and product substitutes; tracking and assessing the efficiency of state and local charges, taxes, and legislation in reducing both the volume and the toxicity of the waste stream; analyzing the feasibility of economic incentives and regulatory approaches; and making significant strides in public education and outreach.

Lead and Cadmium Substitutes Study

EPA is currently considering both regulatory and nonregulatory options to encourage further recycling of or the use of substitute materials for the toxic constituents in household products. Last January, EPA released a report entitled "Characterization of Products Containing Lead and Cadmium in Municipal Solid Waste in the United States." Lead and cadmium are good starting points for studying the sources of toxic constituents in MSW because such high concentrations of both metals have been found in combustor ash, making the disposal of the ash problematic. The Lead and Cadmium Report identified automobile and household batteries as the largest sources of lead and cadmium in MSW.

Using the findings from the Lead and Cadmium Report, EPA is now researching potential substitutes for lead and cadmium in products. These results should be out later this fall. EPA is also looking at other toxic constituents and will be evaluating the sources of mercury in municipal solid waste next year. While studying the sources of toxic constituents in products and looking for possible substitutes, we will also be evaluating the relative toxicity of substitutes to ensure the replacements do not pose similar or other problems when disposed of as MSW.

Recyclable HHW

Recyclable HHW refers to waste materials that can be separated out of the municipal waste stream for purposes of recycling or special treatment. These wastes require special handling practices and should be recycled when feasible.

Lead-acid batteries are a component of MSW that can be recycled. Lead-acid batteries (primarily from automobiles) rank first, by a wide margin, of the products containing lead that enter the MSW waste stream. Recycling of these batteries has a major effect on the overall tonnage of batteries discarded. For example, the recycling rate of lead-acid batteries reached a high point of 80% in 1986; if there were no recycling of batteries, up to 700,000 additional tons of lead would have been discarded. Even with this high level of recycling activity, lead-acid batteries still comprise the largest source of lead in MSW. As a nation, we need to find ways to increase the safe recycling of lead-acid batteries.

Used oil, another recyclable HHW waste material, is largely dumped in the trash, into sewers, or on the ground; currently only 10% of used oil is recycled. If all the used oil that is now being disposed of improperly by do-it-yourselfers were recycled, the energy produced could power 360,000 homes each year or produce 96 million quarts of high-quality motor oil. On the other hand, 1 gallon of used oil from a single oil change can contaminate a million gallons of fresh water - a year's supply for 50 people.

Design for Waste Reduction Grant

EPA's major effort dedicated to municipal solid waste source reduction is currently being carried out through a grant to the Conservation Foundation. The Conservation Foundation will convene and work with a steering committee of MSW source reduction experts representing government, industry, and public interest groups to oversee research and policy analysis and to help develop recommendations. The final report, which is scheduled for release this fall, will include:

- o Recommendations for source reduction opportunities;
- o Discussions of life-cycle analyses as a method of identifying and evaluating opportunities for reducing the toxicity and volume of municipal waste through changes in product and packaging design; and
- o Recommendations by the steering committee encouraging design for waste reduction.

In addition, as part of this grant, the steering committee will make recommendations for a corporate recognition program for outstanding MSW source reduction initiatives and actions which will be available in early 1990.

CONEG Source Reduction Task Force

EPA also awarded a grant to the Coalition of Northeastern Governors (CONEG) Source Reduction Task Force to assist them in developing a hierarchy for source reduction in packaging. This Task Force represented state and industry groups in the Northeastern states. As a follow-up to CONEG's report issued in September, the Task Force is working on the following three issues:

- o Drafting of model state legislation, for introduction by the Northeastern states in the 1990 legislative session, to reduce to the maximum extent feasible toxic agents such as lead, cadmium and mercury from packaging sold or used in the Northeast;
- o Development of specific regionally agreed-upon definitions for preferred packaging practices as a basis for source reduction initiatives; and

- o Development of a detailed plan that would allow the Northeastern states to coordinate long-term source reduction activities with each other and with industry, citizen groups, and others.

Economic Incentives/Disincentives

In addition to these two major grant projects, EPA is evaluating economic incentives and disincentives, including:

- o Volume/weight-based pricing for MSW, or paying for what you throw out; and
- o Taxes on MSW disposal, the revenue from which would be dedicated to promoting recycling and/or source reduction.

Public Outreach and Education

EPA has released a number of documents to further public education on source and toxicity reduction and recycling, including:

- o **Used Oil Recycling How-To.** To assist with nationwide recycling efforts, EPA is distributing a manual and a series of brochures on used oil recycling. The manual, How to Set up a Local Used Oil Recycling Program, covers step-by-step design of an appropriate recycling program, the costs and logistics, and how to organize public and private sponsors. The brochures, which are designed as educational tools for local collection programs, cover information on public participation in used oil recycling programs, how to change oil in 10 simple steps, and the role service stations play in facilitating oil recycling.
- o **The Decision-Makers Guide.** The Decision-Makers Guide is a guide is to assist local solid waste management decision-makers to develop an integrated waste management program. The guide includes practical, how-to information on developing programs and evaluating technical options, including development of household hazardous waste programs. Volume I will be finalized this year. Volume II, which will be completed in 1990, will contain more technical information and details on specific program designs.
- o **Bibliography of Municipal Solid Waste Management** Alternatives. This annotated bibliography, published in August, provides key references on source reduction and solid waste management alternatives, including information on household hazardous waste management. EPA plans to update the Bibliography annually.

In the future, we hope to generate educational materials that promote environmentally sound approaches to purchasing and disposing of products. We need to encourage the public to consider a product's impact on the environment through the MSW stream. Consideration needs to be given to such things as recyclability, toxicity, and durability. Similarly we need to educate manufacturers to change the design and characteristics of products so that they are less toxic, more durable, and produce less waste.

And, finally, this year specifically in the area of HHW, we are producing a "how to" manual on household hazardous waste collection programs, providing technical assistance to the public for household hazardous waste management, and partially funding a household hazardous waste newsletter. And, of course, we hope to continue to sponsor these annual conferences.

IV. Status of Existing HHW Collection Programs

While EPA has been very actively promoting pollution prevention over the last year, a significant amount of activity has been occurring in household hazardous waste collection out in the field. By the close of 1988, there were 1,333 household hazardous waste collection programs in 43 states. By the close of 1989, approximately 2000 collection programs are projected to have been held in 45 states. If you keep in mind that the very first household hazardous collection program was initiated in 1981 - only 8 years ago - the statistics are impressive.

And the number keeps growing as more communities and municipalities turn to permanent collection facilities as a solution to the problem of toxics in their municipal waste stream. One success story is the facility sponsored by the City and County of San Francisco, which collected over 56,000 containers of household hazardous waste from more than 3,000 participants during its first year of operation.

Other permanent collection facilities were recently completed or are being planned in Connecticut, Massachusetts, Rhode Island, New York, Michigan, Minnesota, Alaska, Arizona, Colorado, and Utah. In Florida 18 counties are under contract with the state to construct permanent facilities. In addition, many other states held collection days in 1989, such as the curbside collection of used motor oil held in over 100 Oregon communities.

From all of these programs several trends can be observed:

1. A growing emphasis on permanent as opposed to one-day collection sites;
2. An increase in collections specializing in special wastes such as used oil and household and lead-acid batteries; and
3. An increase in recycling, in general, of as many materials as possible, including paints, solvents, car and household batteries, oil, and antifreeze.

V. Issues of Concern

Before I conclude, a number of issues and EPA recommendations concerning the handling of household hazardous waste should be revisited at this time. These issues were discussed at last year's conference, and were clarified in a November 1, 1988 EPA policy memorandum title "Clarification of Issues Pertaining to Household Hazardous Waste Collection Programs."

RCRA Regulation

The first issue involves the regulatory status of HHW collection programs under RCRA. As you know, household hazardous wastes are exempt by definition from the federal RCRA hazardous waste regulations promulgated under Subtitle C. This exemption applies even when such wastes are accumulated in large quantities, including during household hazardous waste collection programs. Therefore, handlers of HHW are not potentially liable under RCRA Subtitle C for failure to follow the regulations.

However, it should be noted that if household wastes become mixed with regulated hazardous wastes (e.g., from 100- to 1,000-kg/month small quantity generators), the resulting mixture is considered hazardous waste and is thus subject to those requirements. Last year we clarified the status of accepting small quantity generator (SQG) waste at HHW collection programs. A number of questions arose as a result of this clarification, and the issue regarding collecting waste from SQGs that produce between 100 and 1,000 kilograms of hazardous waste and those that produce under 100 kilograms of hazardous waste per month - the conditionally exempt generators - will be addressed in a session on Wednesday.

It is important also to add at this point that some states may have more stringent regulations concerning household hazardous waste management. Therefore, you need to check with your state agency as well as the federal requirements to determine the full extent of restrictions that may apply to household hazardous waste collection in your state.

EPA Recommendations for Household Hazardous Waste Management

Regardless of the fact that household hazardous waste is exempt from regulations governing hazardous waste, EPA strongly recommends that household hazardous waste collection programs manage the collected materials as hazardous waste. This waste should be manifested, transported, and disposed of as hazardous waste. When a community has already gone to the effort and expense of collecting these materials, Subtitle C controls provide a greater level of environmental protection. In selecting a management option, EPA recommends that program sponsors follow the waste management hierarchy of:

- Reusing and recycling as much of the waste as possible,
- Treating waste in a hazardous waste treatment facility, and
- Disposing of the remaining waste in a landfill.

CERCLA Liability

The final issue to be clarified regards HHW collection program liability under CERCLA. CERCLA does not contain an exclusion from liability for household hazardous waste or an exclusion based on the amount of waste generated. Any waste that qualifies as a hazardous substance under CERCLA is subject to the liability provisions of Section 107. If a household waste contains one or more of these substances - whether or not it is a RCRA hazardous waste - potential CERCLA liability exists.

However, potential liability exists under the CERCLA law regardless of whether the household hazardous waste was picked up as part of a community's routine waste collection service and disposed of in a municipal solid waste landfill or if it was gathered as part of a special collection program and taken to a hazardous waste landfill. The additional safeguards provided by collecting and managing household hazardous waste in accordance with the rules for managing hazardous waste may reduce the likelihood of environmental and health impacts and, therefore, may also reduce the potential for CERCLA liability.

VI. RCRA Reauthorization Bills

Before closing, I'd like to look to the future with you for a moment at some of the issues addressed by proposed legislation for reauthorization of the Resource Conservation and Recovery Act. These new provisions address numerous areas of hazardous waste and municipal solid waste management from source reduction and recycling to the dissemination of public information and the directing of new research.

Issues addressed by these bills affecting HHW include:

- Requirements for states and municipalities to separate, collect, and safely dispose of household hazardous waste;
- Requiring EPA to submit plans on recycling HHW;
- Requirements for states and municipalities to separate, collect, and recycle tires, lead acid batteries, and major household appliances;
- Requiring states and municipalities to utilize source reduction and recycling as preferred options for solid waste management;
- Requiring a list be published of products containing toxic chemicals;
- Requiring measures be implemented to promote the sale of recycled goods;
- Requiring recycling of certain waste streams such as lead batteries along with a requirement for producers and retailers/wholesalers to accept used batteries from customers for recycling;
- Bans on the disposal of lead-acid batteries in landfills and incinerators; and
- Requiring federal procurement of recycled products.

It is clear that these legislative proposals have greatly increased the focus on toxicity reduction and management of toxics in MSW. We look forward to working with Congress towards finalizing some of these proposals.

VII. Conclusions and Thanks

In conclusion, progress made over the last several years in pollution prevention and HHW management, in particular, is impressive. Yet there is still much to be accomplished, in terms of educating the public about risks, reducing the toxicity of the products we make or buy, minimizing waste production, and safely recycling or disposing of any waste that is produced. We, at EPA look forward to sharing ideas with you during the next few days, and hearing your concerns in the area of household hazardous waste management so that we will be better able to serve you as you accomplish these goals in your own communities.

Finally, on behalf of EPA, the Office of Solid Waste, and our Region IV Office, I want to thank you all for your interest in this very important area and for your participation in what promises to be an exciting few days of putting our heads together to mutually solve the problems of household hazardous waste minimization and management. I want to extend my special thanks to the members of the Governmental Refuse Collection and Disposal Association and to Dana Duxbury and Associates. The conference they have planned promises to be very comprehensive and exciting. It's a great pleasure for me to be here, and I know it's going to be a very rewarding experience for all of us.

A FEDERAL LEGISLATIVE UPDATE

Gerry Dorian - Director of Environmental Legislation
Subcommittee on Transportation and Hazardous Materials,
U.S. Congress

Federal and state governments are recognizing that the artificial delineation between hazardous and non-hazardous solid waste made by the Solid Waste Disposal Act (SWDA) is not providing the level of environmental protection that was envisioned. Congress, as demonstrated by Senator Lukens draft bill, recognizes now that there is no waste type that is totally benign if mismanaged. It is recognition of the non-benign character of municipal solid waste (MSW) which is driving Congress to look at an entirely restructured SWDA.

Congress wants EPA to identify toxics which are pervasive in the post-consumer waste stream, not just based on abundance, but by looking at persistence and fate in transport under a variety of management scenarios. Lead and cadmium have been identified as two villains - Congress wants EPA to identify other elements of concerns and determine what should be done about them.

HHW, appliances and tires are being identified by Congress as a segment of the household waste stream which needs to be managed in a special environmentally protective way, and to be kept out of landfills and incinerators. A mandatory battery take-back system is being proposed to keep lead-acid batteries out of landfills and incinerators, and would put responsibility on consumers, manufacturers, wholesalers and retailers to manage these batteries in a protective way. The secondary lead smelters, the industry which recovers lead from spent lead-acid batteries, will be required, under Senator Lukens' proposal, to be fully permitted under Subtitle C of the SWDA.

Used oil is being approached from a variety of perspectives, with the primary goal not to impede reprocessing, recycling, and re-refining, and to focus on the primary culprit - the do it yourself (DIY) oil changer. Congress will require EPA to develop a program to ensure proper management of used oil. Guidelines have been developed for a used oil management and recycling program under Subtitle C. There is also a proposal that used oil destined for disposal go to a fully permitted facility. An economic incentive plan for used oil is being proposed based on a credit or buy-back system, with the burden of responsibility to rest predominantly with the primary refiners.

One of the more ambitious proposals now pending in the Senate and which will shortly be introduced in Senator Lukens' bill is a tax on raw materials which would generate revenue for a fund for state environmental or recycling programs.

Senator Lukens' bill will be introduced shortly, and will be similar to what was already released for discussion, but not entirely the same by any stretch of the imagination. It is anticipated that the SWDA reauthorization will be one of the most hotly debated topics of 1990, though depending in part on the course taken by the Clean Air Act reauthorization.

THE HISTORY OF HOUSEHOLD HAZARDOUS WASTE MANAGEMENT 1980-89

Dana Duxbury
Dana Duxbury & Associates

Throughout the 1980's there has been a significant increase in awareness of household hazardous waste management (HHWM) issues, and in HHWM activities. This growth has occurred all across the country with the greatest activity on both coasts and in the upper mid-west.

Increased awareness and responsibility has occurred in government at all levels, in industry, in the media and amongst citizens and environmental groups. The US Environmental Protection Agency (EPA) not only sponsors a national conference each year, but is funding technical assistance, producing a How-To publication on establishing an HHWM program, and helping to fund a national newsletter on the issue. Many state governments provide technical assistance, produce and distribute educational materials and have funded matching grant programs for HHW collections. Localities have been the major sponsor for HHW collection programs. A few industries have sponsored programs, some have altered the composition of their products to remove or reduce the hazardous constituent, and one trade association (paint and coatings) has developed a voluntary labelling program. Citizens have looked for ways to be part of the solution and they and environmental groups have often been the catalyst for the establishment of programs.

There has been a tremendous growth in activity, especially during 1989. First, there has been a growth in the number of collection programs. Figure 1.a shows the number of collection programs that have been held each year, totalling 1,990. In 1989, 628 programs were held. These programs were mainly one day events but more and more we see that communities are institutionalizing their program and often holding more than one a year. Programs have been held in 45 different states (see Figures 1.b and 1.c) since 1980. During 1989, programs were held for the first time in Idaho, and Wyoming. These collections programs include drop-off sites where all categories of HHW are accepted, curbside used oil collections, paint only, dry cell battery only, farm pesticide only, and HHW with conditionally exempt generator waste.

There is also a growing interest in permanent programs and a corresponding increase in the number of these programs. A permanent program according to my definition is one which is open at least once a month at a fixed or mobile facility. Appendix VII shows the growth in these programs and the states in which they are located.

Various trends have been emerging. There is a:

Broadened scope of concern - sponsors are not just concerned about HHW in landfills. There is a concern about the production and use of hazardous household products, HHW storage in homes, and attention on protecting air and water quality by minimizing HHW in incinerators and wastewater, as well as in landfills.

Broadened range of products - program sponsors are concerned about the traditional HHW categories, but also about a growing number of products - from televisions and other high tech equipment, to white goods such as refrigerators and washing machines, to lead and cadmium in plastics and pigments.

Broadened group of generators - HHW programs are becoming increasingly perceived as a potential means of capturing waste from conditionally exempt generators (0-100 kilograms per month), such as schools, farms, some small businesses.

Broadened type of program - not only do we see the typical one day program for all HHW, but we see specialty programs such as used oil-only or paint-only, permanent facilities, and even the first mobile permanent facility.

Broadened realm of program - HHW programs are being integrated with solid waste management programs especially with recycling programs and also with sewage treatment facility programs.

Broadened sophistication of program management- program sponsors have continued to refine requests for proposals (RFPs) and contracts with hazardous waste contractors, HHWM experts have been put on the staff of many contractors, toll-free numbers for HHW information have been provided, specialty equipment has been developed to improve and speed collection programs.

Broadened appreciation for following the waste management hierarchy (which in order of preference is source reduction, recycling, treatment, and landfill disposal) - in Florida's Amnesty Day 1 program 75% of the waste was landfilled in a hazardous waste landfill. In Amnesty Days 2 only 5% of the waste is being landfilled. In an analysis of permanent programs, DD&A has documented that from 5-30% of the waste is going to a hazardous waste landfill. Program sponsors have been looking at the items which come in most frequently like paint and finding ways to reuse or recycle them.

Broadened awareness of the need to maximize participation within affordable means - in addition to recognizing the educational value of HHWM programs, sponsors are viewing them as a credible means for significantly reducing the amount of hazardous waste disposed improperly by households and conditionally exempt generators. It is recognized that stable funding mechanisms need to be established. This can be in the form of tipping fees, utility bill surcharges, or internalizing program costs in the cost of products.

Broadened educational efforts - program sponsors are realizing more and more that they must have a viable on-going education program as well as a collection program. The education program should ensure that consumers learn how to reduce their consumption of products with hazardous constituents and how to properly manage of those wastes already stored in homes and those they cannot currently avoid generating, such as motor oil from cars.

Broadened vocabulary - a whole new set of terms have entered our vocabulary - pollution prevention, environmentally friendly products, product stewardship, integrated and comprehensive programs, internalization, hierarchy, toxic use reduction.

Broadened attention by state legislatures and in RCRA reauthorization - programs have been established, others have required local and regional planning for HHWM, specialty waste taxes have been required and new permanent facility regulations have been developed in two states.

There has even been an HHWM newsletter established, and more and more when you pick up a magazine or a newspaper there is an article on HHW. Its been an exciting year and with Earth Day 1990 in the wings, who knows where we will be next year at this time.!

FIGURE 1.a

Total Number of HHW Collection Programs per Year

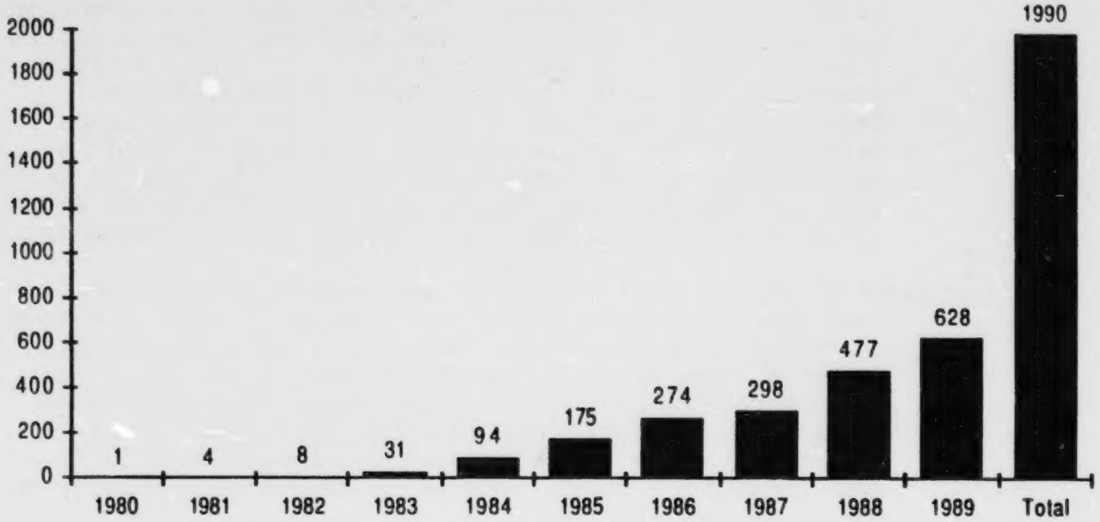
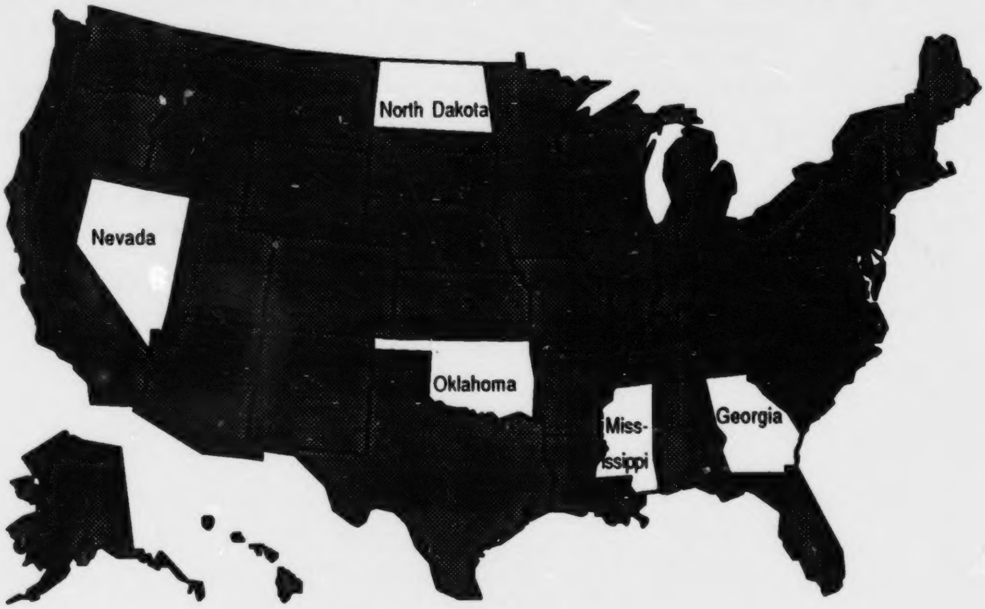


FIGURE 1.b

States ■ in Which HHW Collections Have Been Held - 1980-1989

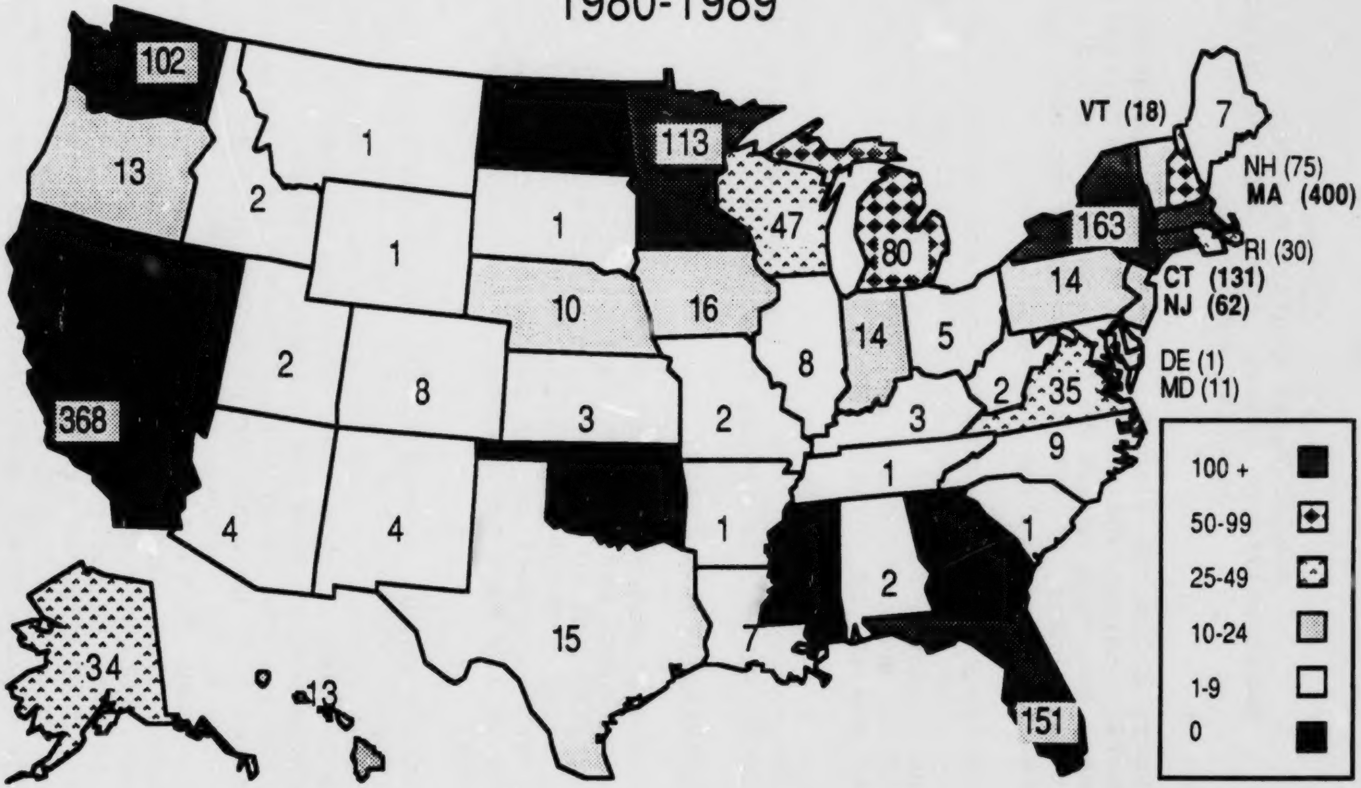


SOURCE: DANA DUXBURY & ASSOCIATES
JANUARY 19

FIGURE 1.c

NUMBER OF HHW COLLECTION PROGRAMS PER STATE

1980-1989



Source: Dana Duxbury and Associates January 1990

Why Household Hazardous Waste Management Is Needed

by

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Why worry about the disposal of hazardous household products? Anyone who has worked at an HHW collection probably has some answer to that question, based on the sheer quantities, variety and age of items that get turned in when people are given the opportunity.

People use a lot of hazardous consumer products and often misuse them, as the three examples in Figure 1 show. When old or unwanted amounts are thrown away, they retain their hazardous characteristics and can pose problems in the waste stream and in the environment.

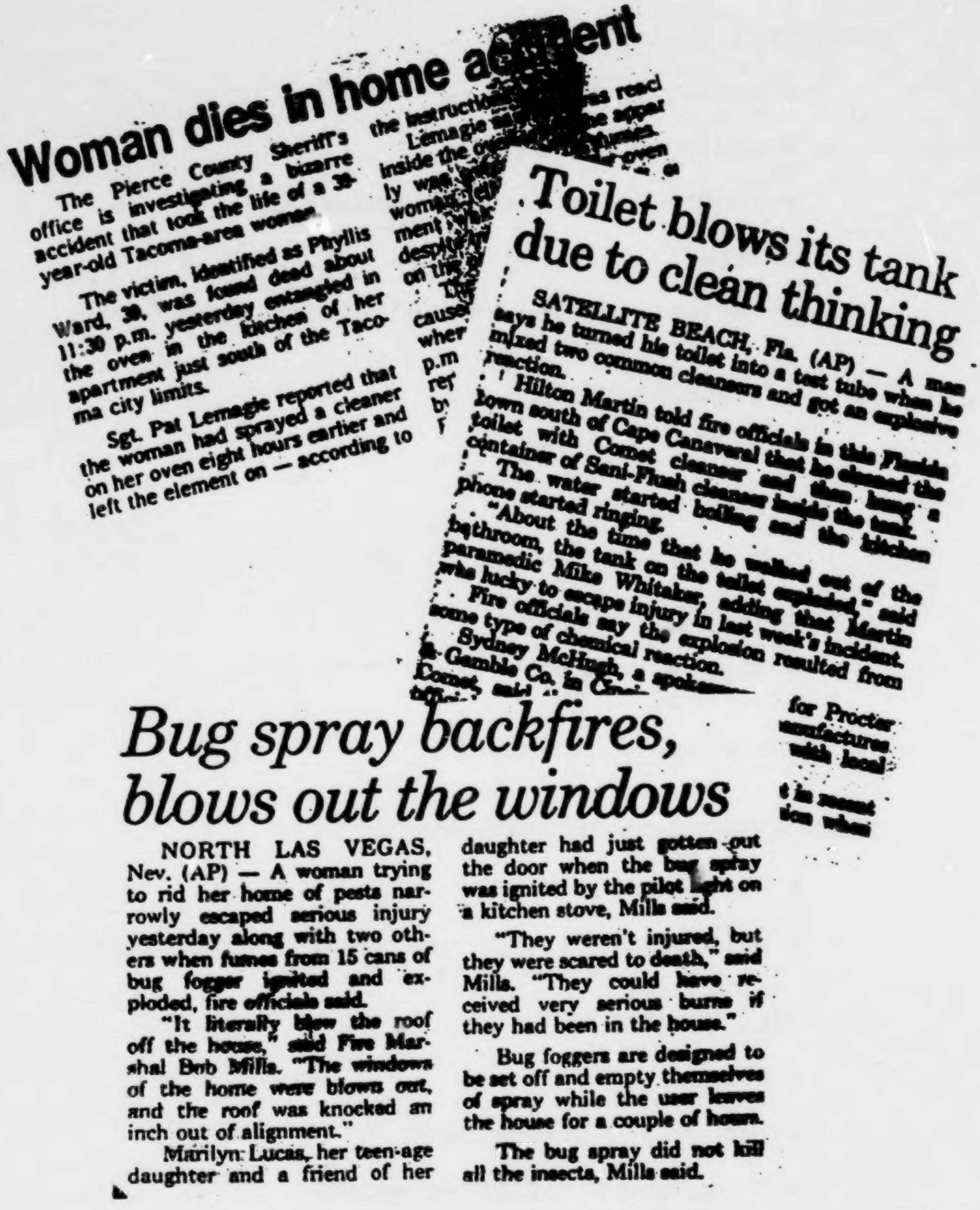
I would like to briefly review potential problems or areas of concern resulting from the improper handling of household hazardous wastes, following the outline in Table 1.

I. Municipal Solid Waste:

Americans produce about 160 million tons of solid waste per year, of which ten percent is recycled, ten percent is incinerated and 80 percent (130 million tons) is landfilled (EPA, 1989). Those quantities figure out to be 1300 pounds per person per year or 3.5 pounds per person per day; 3500 pounds or 1.7 tons per household per year. That's a lot of garbage.

Amidst the paper, orange rinds, glass and cans, how much is hazardous? Various solid waste sorts have all tended to find that 0.3 to 0.5 percent by weight of municipal solid waste is identifiable items that can be labeled household hazardous wastes (see Cal Recovery Systems, 1985; Rathje et al., 1987). The Seattle-King County area has settled on a figure of 0.33 percent for planning purposes (Local Hazardous Waste Management Plan for Seattle-King County, 1989). Dana Duxbury, in a recent Waste Age article (Duxbury, 1989), uses a figure of 0.5 percent as a national average. What is the significance of a level of 1/3 to 1/2 of 1 percent in municipal solid waste? This is subject to plenty of dispute or difference of interpretation. The EPA-funded study in Marin County, CA, and New Orleans, LA, (Rathje et al., 1987) concluded, "There are significant amounts of hazardous wastes in household garbage, and even

FIGURE 2.a



Woman dies in home a[illegible]ent

The Pierce County Sheriff's office is investigating a bizarre accident that took the life of a 38-year-old Tacoma-area woman.

The victim, identified as Phyllis Ward, 38, was found dead about 11:30 p.m. yesterday entangled in the oven in the kitchen of her apartment just south of the Tacoma city limits.

Sgt. Pat Lemagie reported that the woman had sprayed a cleaner on her oven eight hours earlier and left the element on — according to the instructio[illegible]es reac[illegible]

Lemagie sa[illegible]e appar[illegible] inside the ov[illegible] oven [illegible]ly wa[illegible] woma[illegible] ment [illegible] despit[illegible] on th[illegible]

Th[illegible] cause[illegible] wher[illegible] p.m[illegible] rep[illegible] by[illegible]

Toilet blows its tank due to clean thinking

SATELLITE BEACH, Fla. (AP) — A man says he turned his toilet into a test tube when he mixed two common cleansers and got an explosive reaction.

Hilton Martin told fire officials in this Florida town south of Cape Canaveral that he cleaned the toilet with Comet cleanser and then hung a container of Sani-Flush cleanser inside the tank.

The water started boiling and the kitchen phone started ringing.

"About the time that he walked out of the bathroom, the tank on the toilet exploded," said paramedic Mike Whitaker, adding that Martin was lucky to escape injury in last week's incident.

Fire officials say the explosion resulted from some type of chemical reaction.

Sydney McHugh, a spoke[illegible] for Procter & Gamble Co. in Cinci[illegible] manufactures Comet, said [illegible] with local offi[illegible] t in recent [illegible]sion when

Bug spray backfires, blows out the windows

NORTH LAS VEGAS, Nev. (AP) — A woman trying to rid her home of pests narrowly escaped serious injury yesterday along with two others when fumes from 15 cans of bug fogger ignited and exploded, fire officials said.

"It literally blew the roof off the house," said Fire Marshal Bob Mills. "The windows of the home were blown out, and the roof was knocked an inch out of alignment."

Marilyn Lucas, her teen-age daughter and a friend of her daughter had just gotten out the door when the bug spray was ignited by the pilot light on a kitchen stove, Mills said.

"They weren't injured, but they were scared to death," said Mills. "They could have received very serious burns if they had been in the house."

Bug foggers are designed to be set off and empty themselves of spray while the user leaves the house for a couple of hours.

The bug spray did not kill all the insects, Mills said.

Figure 2.a Examples of Problems Caused by the Misuse of Hazardous Household Products.

FIGURE 2.b

MUNICIPAL SOLID WASTE

- worker injuries
- equipment damage
- landfill leachate contamination
- landfill air emissions
- incinerator ash and emission contamination

DOMESTIC WASTEWATER

- worker injuries
- pipe damage
- discharge to water or air
- sludge contamination
- septic tank/drainfield groundwater contamination
- septage contamination

OTHER AVENUES TO THE ENVIRONMENT

- storm drain contamination
- hole-in-the-ground groundwater contamination

LONG-TERM STORAGE

- poisonings
- indoor air pollution
- fires and firefighter safety

Figure 2.b Potential Problem Areas from the Mismanagement of Household Hazardous Wastes.

the most conservative estimates of the amount discarded for a large community are substantial.... It represents a significant quantity...."

So why worry?

a. Worker injuries. Municipal or private workers who pick up household rubbish are exposed to a variety of things when they dump the containers into their trucks or deal with the refuse at transfer stations or landfills. There have been a number of incidents of injuries to workers, but no national statistics are kept, to my knowledge. A California study in 1982 found that three percent of all refuse collection workers in the state were injured due to contact with HHW mixed in with trash and garbage.

b. Equipment damage. Garbage trucks, shredders and other solid waste handling equipment have been damaged from explosions and fires resulting from the chemistry in household trash. Again, national statistics are scarce, but numerous incidents have been reported, including at virtually every operation that involves a shredder (Popp et al., 1985).

c. Landfills. Eighty percent of America's municipal solid waste is landfilled. EPA's Subtitle D report (EPA, 1986a) concluded that:

- more than half of all active landfills in the U.S. are municipal;
- less than half of these municipal landfills have runon/runoff controls;
- only 1/4 of municipal landfills have groundwater monitoring systems;
- only 15 percent of municipal landfills have liners, either clay soil or synthetic; and
- only 5 percent of municipal landfills have leachate collection systems.

Twenty percent of all National Priority List ("Superfund") sites are old municipal landfills.

Leachate from landfills can be contaminated with HHW chemicals. A number of studies have well documented hazardous metals and organic chemicals in municipal leachate, even those far from industrial sources (see Dunlap et al., 1977; Sabel and Clark, 1984). These and related studies implicate consumer products as sources of these contaminants.

Municipal landfills have also been found to produce hazardous air emissions, including vinyl chloride, a known human carcinogen, at levels violating health standards (Wood and Porter, 1986; Battelle Pacific Northwest Labs, 1987). The source of vinyl chloride appears to be bacterial action on chlorinated solvents such as TCE within the landfill.

d. Incineration/resource recovery. Up to ten percent of municipal solid waste is now burned. Concerns have been expressed about the dioxins and furans that are produced in incineration. Major concerns related to HHW involve heavy metals, especially mercury up the stack and lead and cadmium in the ash. The dominant source of these metals in municipal solid waste is household and automobile batteries (Franklin Associates, 1989). At the Danish hazardous waste incinerator in Kommunekemi, every drum of HHW is opened and inspected to remove all batteries and other potential mercury sources. If this is done at a hazardous waste incinerator with state of the art controls, what should we expect at municipal incinerators?

II. **Domestic Wastewaters**:

The advent of keeping human wastes from being tossed out the window and instead carrying them away with water was a great public health benefit -- at least at first. However, today domestic wastewaters carry more than just human wastes; many modern consumer products are either designed to go down the drain or, because they are liquid, get disposed down the drain. Domestic wastewater consists of 99.9 percent water by weight and only 0.02 - 0.03 percent suspended solids, plus even less of other things. However, that doesn't mean sewage is squeeky clean. Relatively small concentrations of chemicals can be quite significant in the liquid waste stream.

A number of studies have documented heavy metals and organic chemicals in domestic wastewaters (see Levins et al., 1979; Gurnham et al., 1979; EPA, 1982; Cooley et al., 1984; EPA, 1986b). These chemicals include cadmium, lead, mercury, nickel and other metals, plus solvents, paint thinners and degreasers such as tri- and tetrachloroethylene, methylene chloride, benzene, and toluene, pesticides such as DDT and lindane, and plastic components known as phthalate esters.

So why worry?

a. On-site systems -- septic tanks and drain fields. About one-third of all U.S. housing units use septic tanks, cesspool or other forms of on-site wastewater disposal. Human, organic wastes can be decomposed in these systems, with soil used as a final filter , but they are not designed to handle hazardous chemicals. On-site systems are concentrated in the U.S. Northeast, with lesser concentrations in Florida, southern California and the Northwest.

Studies have found organic chemicals passing right through septic tanks and drainfields into groundwater (Tomson et al., 1983; DeWalle et al., 1985; Kolega et al., 1985;

Kolega, 1989). An EPA study (EPA, 1984) concluded, "Only 40 percent of existing septic tank systems function properly....[O]f all groundwater pollution sources, septic tank systems and cesspools rank highest in total volume of wastewater discharged directly to soils overlying groundwater and they are the most frequently reported sources of contamination."

b. Municipal sewerage systems. Publicly-owned sewage treatment systems often have industries and commercial businesses plumbed into them, but usually their predominant customers are households. Sewerage systems employ at a minimum primary treatment, which relies on gravity settling of solids, and usually secondary treatment, which uses bacteria to further break down organic materials; some systems also have tertiary or advanced treatment to remove specific problems such as nutrients. None of these treatment processes were designed specifically for hazardous chemicals. Some do in fact "treat" certain hazardous chemicals, but do so for the most part by shifting them into another medium such as air or solids.

All studies that have looked at contributions of chemicals into municipal sewerage systems have documented residential sources of heavy metals and organics (see previous references). Relative contributions will vary a lot depending on the mix of industries and businesses in the sewerage area, but all systems receive major input from households and can't afford to ignore these sources to keep effluent quality and sludge quality high. While most effects are cumulative from many small sources, it doesn't take much of some things to cause real havoc to a sewage treatment plant. For example, a pint jar of mercury was turned in at one of the Seattle area HHW Round-Ups. If this single household's accumulation had instead been dumped down the drain, it would have contaminated our whole system, causing violations of effluent limits and contaminating sludge, even in Seattle's largest, 125-million-gallons-per-day plant.

III. **Other Avenues to the Environment**:

a. Storm drains. Urban runoff carries lots of junk off road surfaces into local rivers, lakes or bays. But people also tend to dump all kinds of things down catch basins, gutters or street drains -- out of sight is out of mind. This is an especially common avenue for used motor oil and antifreeze, but also for such things as pesticides, car wash water, gasoline, brake fluid, paint rinse water, masonry acid rinses and just about every other liquid waste from an outdoor activity. Explosions have occurred in drain pipes, usually from gasoline dumping. Fish kills and water pollution are the more common result, since most storm drains discharge directly into the nearest body of water without any treatment.

b. Holes in the ground. Similar to storm drain dumping, many HHWs are simply disposed on or in the ground. Used motor oil, old, liquid pesticides and paints are commonly handled this way, with resulting opportunities for the wastes to be washed through the soil directly into groundwater. This practice coupled with the vulnerability of its groundwater was one of the driving concerns which resulted in establishment of Florida's HHW Amnesty Days program.

IV. **Long-term Storage**:

As we all know, many products sit on the shelves for years or even decades. Any HHW collection well illustrates this point. Why worry?

a. Poisonings. Safety in the home, especially for young children, is a reason for concern about stockpiles of hazardous products, especially old, often more dangerous items. Twenty-five percent of Seattle Poison Center's calls and 30 percent of Minnesota's poison calls relate to hazardous products.

b. Indoor air pollution. Recent studies have concluded that indoor household air is often much more contaminated than ambient outdoor air. While there are many reasons for this and many sources of the various indoor air pollutants, hazardous consumer products are an identified source for organic chemical vapors and other contaminants.

c. Fires. Fire safety is an additional reason for concern. Spontaneous fires have been traced back to old products such as volatile solvents, old gasoline and exotic chemicals such as picric acid being stored in homes. Firefighters are becoming increasingly aware of and concerned about their exposure to fumes in the event of a fire. Previously this concern was limited to industrial fires, but increasingly it reflects awareness of the myriad of chemicals stored in the average house.

Summary:

Why are household hazardous waste management programs needed? There is a lot of HHW out there and it can cause human safety concerns as well as environmental concerns. It is becomming increasingly accepted that it would be a whole lot better to manage HHW separately from the regular municipal waste streams. Programs are needed that will manage HHW safely and properly in order to minimize actual and potential problems from the current mismanagement of HHW.

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INTEGRATING HHWM WITH A COMPREHENSIVE SOLID WASTE MANAGEMENT PROGRAM

Dana Duxbury
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Communities around the country are developing comprehensive municipal solid waste (MSW) management programs. These programs seek to implement the waste management hierarchy at the local level - reduction, recycling, composting, incineration, and landfill disposal. In a comprehensive program, reduction is sought both in volume and in toxicity. HHWM programs are seen as a viable means to deal with toxicity. An HHWM program includes provisions to manage the quantities of waste stored in people's homes, and today's unavoidable waste (such as used motor oil) for which there are no non-toxic substitutes. Through extensive educational initiatives, HHWM programs also encourage the use of non-hazardous alternatives for future purchases.

Why Integrate Programs?

There are many reasons for integrating HHWM with a comprehensive MSW management program. The first is health and safety in the community, for sanitation workers, recycling center/processing facility workers, and for landfill and incinerator operators (especially when shredding of MSW is involved). Removing the toxic component from MSW reduces the potential for toxic leachate from landfills, protecting groundwater and air quality. It also can reduce the toxicity of incinerator ash. When new MSW composting, incinerator or landfill projects are proposed, an accompanying HHW program gives the community a greater level of protection and confidence in the new facility. When the projects are combined at one site, it promotes participation.

How to Integrate

HHW programs can be combined with an MSW reduction program. They can also be combined with a recycling drop-off center, a recycling processing center, a drop-off at a combustion facility, at a composting facility, or at a landfill. In Larimer County, Colorado, in addition to accepting HHW at a permanent drop-off center at the landfill, hazardous waste mixed in with the regular trash is screened and diverted to the HHW storage facility through a load checking program.

Certain items can be combined with curbside pick-up, such as car batteries, dry cell batteries, and used oil. Many communities are banning certain items from mixed trash. Load-checking programs at incinerators and landfills are also being used to pull out HHW.

Increasingly, through legislation which will require that communities plan how they will reduce the toxicity of their waste streams and through the realization that pollution prevention is cheaper that pollution clean-up, more and more communities will integrate HHWM programs with their solid waste management programs.

INTEGRATING HOUSEHOLD HAZARDOUS WASTE MANAGEMENT AND RECYCLING PROGRAMS

NED T. BROOKS

MINNESOTA POLLUTION CONTROL AGENCY

Efforts to keep household hazardous waste (HHW) out of the solid waste stream are growing in strength and will likely achieve the level of success that recycling programs have gained in the near future. These two programs, recycling and HHW management, have largely been promoted and implemented separately despite a common goal of keeping these materials out of the solid waste stream. Because of this common goal, and the need to provide the public with convenient access to comprehensive solid waste management, programs integrating HHW and recycling are growing in number.

Household products such as paints, paint thinners and strippers, solvents, pesticides, fuels, motor oil, batteries, and some cleaners are items that can become household hazardous waste when disposed of improperly. These materials contain many of the same chemicals found in industrial hazardous waste and can be a health and environmental hazard if disposed of in the trash, down the drain or on the ground.

The most common response to the HHW issue has been to hold collections, usually on a single day. Some communities have begun to explore permanent collection sites. A number of communities have explored integrating HHW management and recycling ranging from coordination on public education to combined collection.

As with recycling programs, an important part of comprehensive HHW management is public education. The message to the public is similar and simple: keep this material out of the trash. A combined HHW and recycling educational effort is likely to be more effectively and efficiently communicated to the public and certainly more easily understood. It follows that communities with strong recycling programs are often very aware of the need for proper HHW management.

In addition to combined public education programs, combining collection efforts also makes sense. There are a number of permanent HHW collection programs around the country that are part of recycling processing and/or drop off centers, including three in Minnesota. At such facilities, HHW is accepted at designated times or by appointment by trained personnel. The management of collected HHW and recyclable solid waste is, however, vastly different.

To properly and safely store, transport and dispose of HHW, wastes must be segregated into compatible chemical families, put into appropriate containers and handled according to other hazardous waste practices. Depending on how the waste will be disposed of, the sorting and recontainerizing of the waste can be a fairly complicated process. Individuals handling HHW must be trained and provided with specialized safety equipment. For this reason, most communities that have explored explored curbside pick-up programs for HHW, except for batteries and motor oil, found such an approach infeasible and selected drop-off programs instead.

Developing a facility to store HHW is usually not as complex as many think. In fact, the structural requirements for such a facility are fairly simple and include restricted access, an impermeable storage surface capable of containing spilled waste, running water, ventilation, a communication system and expiosion proof wiring. What is complicated about collecting and storing HHW is managing the waste.

One of the major drawbacks to HHW programs is that they are expensive to implement. Unlike recyclables, HHW has an extreme negative value and disposal costs per participant can range from $50-$100. Many program sponsors justify this in terms of reducing environmental liability.

Combined HHW and recycling programs seem to complement each other well and provide the public with the opportunity to participate in a more comprehensive solution to the solid waste problem in a way that is convenient and tangible.

FIGURE 3

3

INTEGRATING HOUSEHOLD HAZARDOUS WASTE AND RECYCLING PROGRAMS

HHW OVERVIEW
ISSUES RELATED TO INTEGRATED PROGRAMS
COMBINED EDUCATION EFFORTS
COMBINED COLLECTION
EXAMPLES OF PROGRAMS

PUBLIC EDUCATION

REDUCE - BUY AMOUNT NEEDED, LESS/NON-HAZ ALT.
REUSE - USE UP, FIND USER
RECYCLE - MOTOR OIL, BATTERIES, PAINT
PROPER DISPOSAL

COMBINED COLLECTION - DROP OFF

ALL MATERIALS
DESIGNATED TIMES
ATTENDED DROP OFF
STORAGE
CONTRACTOR REMOVAL

COMBINED PUBLIC EDUCATION

SIMILAR MESSAGE
EASILY UNDERSTOOD
RECEPTIVE AUDIENCE

COMBINED COLLECTION - CURBSIDE

INCOMPATIBILE WASTES
LABOR INTENSIVE
VEHICLE CAPACITY
LIABILITY - HHW ON CURB
LIMITED MATERIALS

BENEFITS OF INTEGRATED PROGRAMS

CONVENIENCE
INCREASED AWARENESS
COMPREHENSIVE SERVICE
KEEP HHW OUT
PROVIDE PROPER DISPOSAL OPTIONS

Developing a Comprehensive Household Hazardous Waste Management Program

by

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The proper management of household hazardous wastes (hereinafter HHW) is an issue that has emerged in the 1980s as awareness of problems caused by toxic chemicals and hazardous waste has grown among the American public. It has been a true grassroots movement, springing up independently at the local level from coast to coast and sharing information and experience through informal networks. Collection of HHW at single-day events has been the standard approach adopted by local governments, some states, and the occasional private sponsor. In many locales, these collection days have become institutionalized as annual or semiannual events. In other areas, permanent drop-off sites have been established for the ongoing collection of HHW. As the movement evolves and matures, focus is shifting from the quick-fix HHW collection projects to more permanent, long-range HHW management programs that take a more comprehensive approach to the issue.

One of the themes of this fourth national conference is to promote the concept of a comprehensive approach to HHW management, to look beyond one-time-only collection events toward the big picture. My task is to give an overview of this concept, to present my ideas of the mythical, ideal, comprehensive HHW management program, and how one goes about developing it.

Four key points come to mind right away. First, a comprehensive program should address HHW management, not just collection and disposal. This is more than a bureaucratic distinction. We've got to look at reducing the generation of wastes, at reuse and recycling, at special handling for unique or priority waste types and at other actions beyond collecting every bottle and can of HHW, packing them all into drums and shipping them out of state to be "disposed."

Second, a comprehensive program should be ongoing, not restricted to one or two days a year. Single-day events are fine for raising awareness, but what service is available on the following Monday to those that missed the event? We've got to offer year-round answers.

Third, a comprehensive program should be ambitious, with a goal of addressing a significant portion of the total amount of HHW currently stored or disposed and of involving a majority of the public. We cannot afford to feel successful with only five percent participation, barely scratching the surface of what is out there.

And fourth, a comprehensive program should be comprehensive of all waste streams and related issues. While predominantly a solid waste concern, HHW is not exclusively a solid waste concern; it is also an issue for wastewater treatment, storm drainage, worker safety, citizen health and safety, fire prevention, and promotion of environmental stewardship. HHW is also not the only small-quantity hazardous waste finding its way into municipal waste streams and the environment. Local programs should consider addressing conditionally-exempt small quantity generators (knows as CESQGs or V--for very--SQGs), schools, government operations, and other sources of unregulated hazardous wastes. This is to say, be comprehensive in a way that significantly addresses management of small quantities of hazardous wastes.

My ideal, comprehensive HHW management program contains the following 12 elements (all important, but not in any particular order of importance):

- goal setting to define a clear, desired outcome for a program, and to stimulate thinking about making the program ambitious enough to have a significant result;

- public awareness efforts to raise the levels of knowledge of and interest in the HHW issue as something important to worry about;

- source reduction or minimization emphasis to reduce as much as possible the generation of wastes that have to be specially handled; efforts could include promotion of safe alternative products, promotion of proper product use, promotion of using up, reuse, use by others and waste exchange, home treatment of certain wastes, and changes in product contents, labeling and packaging;

- waste collection of those wastes that cannot be reduced; collection should be ongoing, as well as (or in place of) events and could include permanent drop-off sites, mobile sites, one-day or other events, door-to-door or curbside pickup and provision for return to retail outlets;

- priority waste handling once collected; wastes should be handled or managed following a hierarchy of preferred methods that promote reuse and recycling and that minimize disposal via landfills; Washington state law requires hazardous waste management according to the following descending order of priority:

- waste reduction
- waste recycling
- physical, chemical and biological treatment
- incineration
- solidification/stabilization treatment
- landfills;

- waste exclusion and enforcement provisions to keep hazardous wastes out of the municipal waste streams and the environment; efforts could include bans or restrictions on improper disposal with appropriate fines, monitoring to catch violators and to encourage compliance (such as solid waste load checking), and teeth in local enforcement;

- targeting of selected wastes, such as high risk, high volume and/or easily recycled wastes (for example, motor oil, batteries, paints, pesticides);

- public education emphasis to promote waste reduction, to move beyond awareness into changing behavior, to advertise services, and to otherwise get the public to support and participate actively in the program; efforts could include a central telephone line for information and diverse activities aimed at reaching the general public, targeted segments of the public (such as do-it-yourselfers) and schools;

- dedicated financing to operate the whole program on an ongoing basis, ideally separate from the whims of the general fund; financing could come from local utility rates (solid waste tipping fees and sewer rates), special product or hazardous substance tax, or state-cost-sharing from superfund, water quality or other special revenue sources;

- evaluation and revision mechanisms to ensure that the program is dynamic and flexible but also that sufficient documentation and data are gathered to allow for rational, supportable change over time;

- liaison with compatible environmental programs such as solid waste recycling, health promotion, poisoning and fire safety, water conservation, water quality protection--wherever there is overlap and the ability to dove-tail messages and services; and

- communication/coordination/cooperation among all interested and affected entities; everyone in the local program area should be working together to enhance the common plan; this includes state regulators, local agencies such as public works, solid waste and sewer utilities, health departments, agricultural commissioners, poison centers, fire departments, private businesses, licensed treatment, storage and disposal (TSD) facilities, manufacturers, retailers, community organizations and environmental groups.

The overall goal of a HHW management program is to protect public health and the environment from adverse effects resulting from improper handling and disposal of HHW. Specific goals or objectives of a program should include:

- foster an ethic of personal responsibility for waste handling decisions;
- promote waste reduction over collection/disposal; and
- effect a significant reduction in improper handling and disposal of HHW, i.e., reduce the input of HHW to municipal waste streams and the environment by a significant, measurable degree.

I don't think there are any HHW management programs in North America that are addressing adequately all of the points I outlined above. All of our efforts should be taking the long-term, big picture approach and should be striving toward the ultimate goal of proper, safe management of all hazardous wastes, from households as well as other sources.

An Overview of Municipal Solid Waste Source Reduction

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The United States currently is faced with a solid waste crisis - we produce over 160 million tons of municipal solid waste each year and are quickly running out of disposal capacity. In response to this situation, EPA recently issued "The Solid Waste Dilemma: An Agenda for Action", which lays out a national strategy for dealing with municipal solid waste management in the U.S. A key component of this strategy is increasing source reduction and recycling. Source reduction, which is the critical first step to addressing our solid waste problems, involves reducing the quantity and toxicity of materials that enter the municipal solid waste stream. This presentation provided an overview of source reduction actions we can all undertake, reviewed the roles of the general public, industry, and government in promoting and implementing source reduction, and described EPA's source reduction activities.

Source reduction includes both reducing the quantity and toxicity of materials entering the wastestream. Some ways we can achieve waste quantity reduction include using less material in products and packaging, using reusable products instead of disposables, buying only what we need, and practicing home composting of our yard wastes. To achieve toxicity reduction, we must strive to design materials that contain less toxic constituents. When evaluating opportunities for source reduction of municipal solid waste, we must carefully consider the full impacts on public health and environment so that we don't replace one problem with another.

Some of EPA's major municipal solid waste source reduction activities reviewed include:

1. convening of a national source reduction expert group, through a grant to the Conservation Foundation, to evaluate and develop recommendations pertaining to opportunities and incentives for source reduction, including a corporate recognition program;
2. support for regional source reduction efforts, such as the Coalition of Northeastern Governors (CONEG) efforts;
3. development of a comprehensive Report to Congress on Plastics;
4. studies of economic incentives and disincentives to source reduction;
5. evaluation of toxicity reduction opportunities, with initial focus on reducing lead and cadmium in the wastestream; and
6. development of promotion material (e.g., brochures) on source reduction issues.

To be successful, source reduction must be carried out through the cooperative efforts of all involved--including the general public, industry, and government.

Waste Reduction as a Component of an Integrated Waste Management Program

by Martha Burke

INTRODUCTION

In August 1989, Seattle and King County completed a Local Hazardous Waste Management Plan that covered all of King County. This plan, required under state law, was designed to address hazardous waste unregulated at the state level - that generated by households and small quantity generators. In compliance with state guidelines, the plan includes education and collection programs for both households and businesses, as well as compliance and evaluation components. The education component was a major part of the plan. In 1990, education programs represented 29 percent of the budget for households and 42 percent of the budget for SQGs. That percentage drops over time for households as collection programs are added, but by 1994 over a million dollars a year is planned for education of households alone (see Table 1). A major focus of the education component of the plan is waste reduction. This paper describes these waste reduction programs in the context of overall Seattle-King County Plan.

Waste reduction is defined for purposes of this paper as reducing the amount of waste generated. It does not include recycling.

Rationale for Waste Reduction

Before describing these waste reduction programs in detail, it is useful first to understand the rationale for inclusion of waste reduction programs in the plan. One reason is that state policy gives priority to waste reduction over all other management options. The state guidelines for the local hazardous waste management plan require "consideration of the hazardous waste priorities in all programs and activities." (Figure 1)

Another reason is the conviction that waste reduction is more cost-effective than disposal in managing hazardous waste. The cost of disposal of one ton of household hazardous waste was estimated to be $1,300. Adding in the cost of collection raises this cost even higher - $1,400 at a minimum. The cost of waste reduction was estimated to be $350 a ton. This is however, an estimate, and aswill be discussed later in this paper, one objective is to obtain more explicit cost data. As long as the cost is less than that for collection and disposal however, it makes sense to spend money on waste reduction.

Finally, waste reduction makes sense environmentally - the lowest risk method of managing hazardous waste is to not produce it in the first place.

FIGURE 4.a

PLAN BUDGET SUMMARY[1]

	1990	1991	1992	1993	1994	1999	2004	2009
HHW EDUCATION	$531,000	731,000	811,000	986,000	1,176,000	1,046,000	1,041,000	1,041,000
HWW COLLECTION	1,281,000	1,893,000	2,423,000	2,821,000	3,269,000	5,536,000	6,791,000	7,665,000
HHW PROGRAM	1,812,000	2,624,000	3,234,000	3,807,000	4,445,000	6,582,000	7,832,000	8,706,000
SQG EDUCATION	758,000	1,160,000	1,311,000	1,311,000	1,271,000	1,206,000	1,206,000	1,206,000
SQG COLLECTION	381,000	574,000	799,000	958,000	940,000			
COMPLIANCE	650,000	728,000	851,000	987,000	1,090,000	1,355,000	1,338,000	1,338,000
SQG PROGRAM	1,789,000	2,462,000	2,961,000	3,226,000	3,301,000	2,561,000	2,544,000	2,544,000
EVALUATION	140,000	115,000	73,000	73,000	125,000	56,000	63,000	56,000
TOTAL	3,741,000	5,201,000	6,268,000	7,106,000	7,871,000	9,199,000	10,469,000	11,306,000

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[1] in 1989 dollars rounded to nearest thousand. Figures beyond 1994 are gross estimates and are subject to substantial revision at the fifth year (1994) Plan update.

FIGURE 4.b

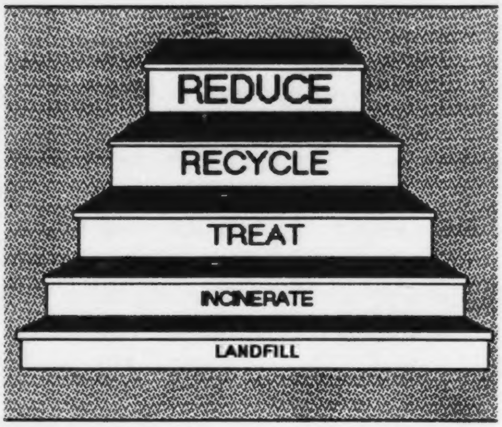

Figure Washington State Waste Management Priorities

FIGURE 4.c

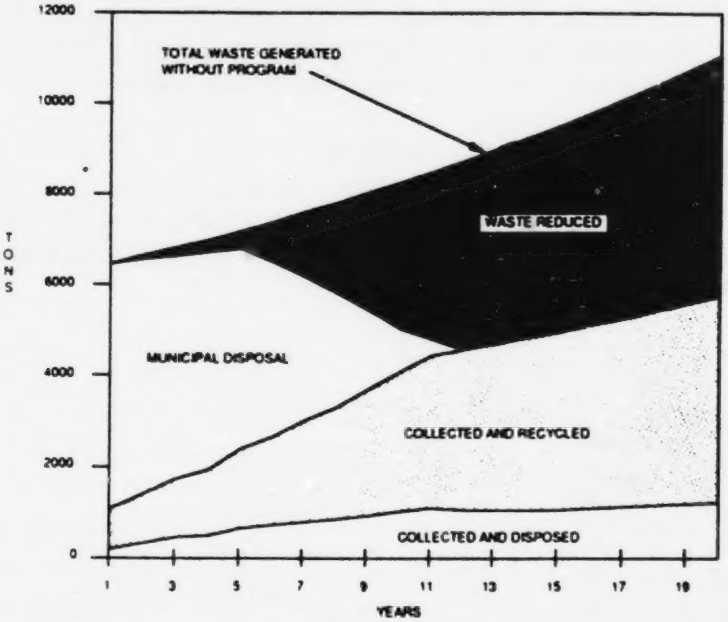

Figure Projections of HHW Management

Goals for Waste Reduction

The state guidelines state that "Plan objectives must be based on a percentage reduction of moderate risk waste in the waste stream, with an ultimate goal of no targeted moderate risk waste intended for landfill or wastewater discharge." In the Seattle-King County plan, it was assumed for planning purposes that by the end of the planning period - 20 years - all waste would be diverted from the waste stream. It was then necessary to determine what mix of programs such as collection and education would be necessary to achieve that goal. With the assumption that waste reduction was the highest management option, we first needed to estimate how much the waste stream could be reduced. The amount remaining would either be recycled or collected and disposed. Thus we started with the assumption that we would attempt to maximize waste reduction, and would plan to minimize collection and disposal.

To determine waste reduction goals, the waste stream was divided into major waste types, such as latex paint. For each type, the amount of waste contributed to the total waste stream was determined, and an estimate was made of the percentage reduction that would be possible to achieve over the time frame of the plan, with an aggressive education program. Part of the reduction would also be attributable to actions taken nationally - changes in manufacturing practices or federal regulations for example. These estimates are shown in Table 2. These are estimates only, based on best professional judgement. Some of the assumptions that went into them are shown in the Table notes. The estimates by waste type were then combined to develop a total waste reduction goal. A similar analysis was done for recycling. The remaining waste would be disposed as hazardous waste.

The results of this analysis is shown graphically in Figure 2. The dark shaded area is the amount of waste that will be reduced. It starts out as a minor amount, with most of the waste still going to municipal disposal. As education programs come on line, and begin to have an impact, after an initial lag time, the percentage of waste reduction increases until by the last year of the plan the amount of waste generated has been reduced by approximately 50 percent.

FIGURE 4.d

Table 2. REDUCTION GOALS FOR HHW, BY WASTE TYPE, BY PERCENTAGE

Waste Type	1990	1994	1999	2004	2009
Latex Paint	0	8	58	73	73
Oil-Based Paint	0	8	42	55	55
Used Oil	0	0	0	10	10
Pesticides	0	4	41	55	55
Solvents	0	0	20	32	32
Corrosives	0	4	41	55	55
Aerosols	0	4	49	64	64

Waste stream specific assumptions:

Latex Paint. As a result of education programs, people will: make better estimates of how much they need for a particular job, and buy less; give away left overs; dry out residues and put in the trash. As a result of education and promotion of alternative purchasing practices, people will buy smaller cans when they only need a little bit. Paints that need not be handled as hazardous wastes will be identified and disposed of in alternative ways. Newer paints will contain fewer and fewer hazardous ingredients.

Oil-based Paint. As a result of education programs, people will: make better estimates of how much they need for a particular job, buy less, and give away left overs; use latex paint wherever possible. As a result of education and promotion of alternative purchasing practices, people will buy smaller cans when they only need a little bit.

Oil and Vehicle Batteries. Waste reduction in these categories is not possible at present. The top priority is recycling.

Pesticides. As a result of education programs, people will: have a better understanding of the potential hazards of excessive pesticide use; learn to use pesticides properly (according to the label); buy smaller quantities; use alternative methods and safer products for pest management; become more tolerant of non-damaging pests.

Solvents. As a result of education programs, people will: buy smaller quantities according to their need; learn to reuse some solvents.

Corrosives. As a result of education programs, people will: a) buy alternative, safer products;buy smaller quantities according to their need.

Waste Reduction Programs

This section describes some of the programs designed to achieve waste reduction. They fall into three categories: education, legislation and product changes. Only the first, education, can really be implemented at the local level, and it is education that was the focus of the Seattle-King County plan. Legislation must be passed on the state or federal level; the plan does include recommendations for state legislation. This section will include some examples of what is being done at the state level. Changes in products usually results either from regulatory requirements (actual or potential) or from perceived changes in market demand. Examples of both will be discussed.

Education

The education programs included in the Seattle-King County plan were targeted at particular groups: schools; other special audiences such as particular neighborhoods, gardeners, hobbyists, etc.; and consumers.

Schools. The purpose of the schools program is to teach children, and through them to reach parents, about the health and environmental effects of hazardous products and about personal responsibility for proper hazardous waste management. The program, as envisioned in the plan would include development and distribution of curricula for all levels from elementary to college level. Teacher training and workshops would be conducted to prepare teachers to use the curricula. In-school programs would be developed, including traveling presentations on HHW alone or in conjunction with other environmental topics such as water quality, recycling, etc. New programs developed under the plan would be coordinated with existing programs. The cost of school programs in 1990 was estimated to be $175,000 (Table 1).

Many other communities are also developing school programs for hazardous waste. San Bernardino County, for example has developed a whole curricula with a video for distribution to schools. Other examples include Seattle Metro's Sleuth program and programs developed by the Golden Empire Health Planning Center. A summary of "Household Hazardous Waste Public Education and Information Materials for Washington State" was developed by the King County Hazardous Waste Interagency Coordinating Committee (January, 1988).

Neighborhoods. Seattle/King County has a strong neighborhood orientation. People identify with the neighborhood they live in. To capitalize on this some programs are directed toward neighborhoods, encouraging people to get involved through their neighborhood organizations. One example is a hazards free neighborhood program that would inform communities of the environmental and safety implications of improper handling and disposal of certain household products. The program would emphasize using safer product alternatives by motivating individuals to reevaluate which products they buy and use, and to encourage behavior changes in this regard. Increased awareness could lead to informal waste exchange programs and other cooperative efforts. The formal parts of the program would be run by a coordinator who would organize neighborhood volunteers. Volunteers would be responsible for distributing brochures and printed information, coordinating waste recycling and disposal efforts, and coordinating an informal product sharing effort. Each participating member of the neighborhood would receive a sticker or decal to display which indicates that the household has helped in keeping the neighborhood "hazards free".

Targeting Garden and Other Hobby Groups. A series of fact sheets called "Alternatives" are being developed through the Washington Toxics Coalition. Each describes alternative products or techniques that can be used to reduce usage of hazardous products. Some of the topics include lawn and garden care and reprints will be made available to garden groups, etc. Workshops for groups like the master gardeners will present information on low impact pest control and answer questions about pest problems. Other sheets will deal with materials commonly used by hobbyists such as adhesives, paints, and inks.

Promotion of Safer Products. Through surveys and focus group discussions, it was found that people are more willing to change their behavior if it does not necessitate great inconvenience. The more accessible alternative products are to consumers, and the easier it is for them to get information about them, the more likely they are to use them. To do that two things are needed. First, safer, alternative products need to be identified. A project being conducted by the Washington Toxics Coalition is identifying products which are non-hazardous or less hazardous and can be used as alternatives to hazardous household products (see Phillip Dickey's paper). Products will be evaluated against a set of criteria, and those that are determined to be non-hazardous will be listed in a computerized database and summarized in a brochure.

Second, information about the products needs to be easily accessible. One way to do this is to get information to consumers at the point of purchase -- in stores -- when they are making decision about what to buy. Information could be provided at kiosks or information centers, at check-out counters, or on store shelves. Information on store shelves could take the form of a shelf tag indicating which products would be non-hazardous.

The reluctance to identify name brands, whether positively or negatively has been one reason agencies have been slow to implement such programs. Iowa recently passed a law, however, which requires all retail stores to identify, through store labels, products that are hazardous. Retailers must also make available to consumers brochures and information signs explaining the labels and telling consumers where the brochures may be found. The labels, information signs and brochures are provided free of charge by the Department of Natural Resources.

Other Local Programs. In addition to programs specifically directed toward waste reduction, other education programs included in the Seattle-King County plan will support waste reduction efforts. For example, the telephone information line, operated by the Health Department, will provide information on waste reduction, along with information on collection services. Information will also be provided through other sources such as municipal solid waste transfer stations. The point is to repeat the message often in many media so it becomes familiar and well known to the public.

Legislation: Product Labeling

Certain waste reduction programs require legislation at least at the state level, if not at the national level. One example is product labeling legislation. With a product labeling program, consumers would be alerted to products that have special environmental and safety implications. Manufacturers could convey a number of messages, via labels, including proper disposal methods and promotion of waste minimization. Less hazardous products could be awarded an "Environmentally Safer" label.

West Germany's "Blue Angel" program is such a program, which has been copied by Canada. Products which qualify as environmentally friendly within specific product categories can utilize a logo on their products to alert consumers. In Washington state a similar law (WSL 1987 Ch. 67) directs the state Department of Ecology to develop and implement an "Environmental Awards Program".

Changes in Product Design

Manufacturers may be induced to change their product design, either due to regulatory requirements or perceived changes in market demand. In either case the result can be a product which is less hazardous.

Paint is one example. Federal regulation now limits the amount of lead in paint. To avoid classification as a hazardous waste, paint manufacturers have themselves been changing their formulations to reduce the amount of mercury in their product. They have also been developing more latex products to substitute for solvent based products, in response to consumer demand. 3M company has recently developed a water-based paint stripper for example.

Other companies and products are following suit. The new "Safer" pesticide and garden product line is much less hazardous than the traditional products. Windex has come out with a vinegar based window cleaner that eliminates the ammonia, and Bon Ami has eliminated bleach from their product formula. Many companies are finding that environmentally "green" products translate into profit "green".

Measuring Effectiveness of Programs

The priority given to waste reduction and education in the Seattle-King County plan, although reflecting state priorities, is a radical departure from the traditional way of doing business. Traditionally education has been considered a "soft" program, minimally funded more as an afterthought than as an integral part of a program, and the most vulnerable to budget cuts. Programs that provide visible services, such as collection programs, are preferred at the local level, and even at the state, most of the hazardous waste funding goes to cleanup efforts, state priorities not withstanding. So an aggressive education program was subjected to skeptical scrutiny regarding the cost-effectiveness of such a commitment of resources.

The fact is there is very little hard data that "proves" the effectiveness of a specific education program in changing behavior to a measurable degree. Partly this is due to the significant lag time between the time someone is exposed to new information, and when they decide to change their behavior. Even if there is a measurable behavior change, it is difficult to correlate that to particular education programs. When someone decides to quit smoking for example, do they quit because of health articles they have read, because of the warning label on cigarette advertisements and packages, or because someone they know that smokes dies of heart disease or cancer? Or is it the cumulative impact of all these messages?

Public health specialists describe four types of social changes that can be attributed to health education that are progressively more difficult to achieve: cognitive change, action change, behavior change, and value change. Developing an awareness of a problem is relatively easy compared to getting people to change their behavior or their values. (Zehner, 1988, p.8)

Nevertheless, there is a real need for better data evaluating the effectiveness of household hazardous waste programs in general, and education programs in particular. Evaluation was built into the Seattle-King County plan as one of its components.

Evaluation occurs on several levels and measures several types of indicators. Evaluation of individual programs implemented under the plan is needed since many of the programs are new and untried. The overall effectiveness of plan implementation must also be evaluated. The success of the plan will require a fundamental change in consumer awareness and business practices. Finally, cost-effectiveness of the programs must be evaluated, to ensure that programs are efficiently carried out.

There are several types of indicators that can be used as a measure of effectiveness. The simplest to measure are activity indicators - the number of brochures distributed, for example, or the number of schools visited. A second, harder to measure type of indicator are changes in attitudes, awareness or practices. These are especially relevant for education programs. The ultimate measure, but harder to tie to particular programs, are measures of the amount of waste in the waste stream.

The specific details of the evaluation program is still being developed, but it will include all of these measures. Surveys could be used to measure changes in awareness and attitudes. As part of the 1987 Roundup, for example, a pre- and post-survey was conducted of adult residents in King County that found that there was a significant increase in awareness of what is a hazardous waste after the event. (Zehner, 1988 p.42) Changes in purchasing practices could be measured by changes in sales of products. For example, a pilot project of getting alternative product information into certain stores could be evaluated by measuring the amount of alternative products which are purchased at the test stores. The ultimate measure would be the amount of waste going into the solid and liquid waste stream, to determine if that is falling over time as programs are implemented.

It would be useful to try to have both test and control populations, to attempt to isolate the effects of various programs. Programs that can be targeted to neighborhoods lend themselves to this. A test neighborhood can be targeted for an intensive educational effort and then compared to a control neighborhood that it is matched with demographically. Surveys could be conducted in both control and test neighborhoods to measure changes in attitudes and awareness. Even the amount of hazardous waste coming from the neighborhood could be measured through waste sorts and wastewater sampling. Targeting stores for information on alternative products is another example. Test stores could be paired with controls where no information is made available, and results compared.

It will not be possible to control for all sources of information however, since some programs target a broad audience, and you cannot ensure that the controls receive no information. Nor will there be a true baseline, since there are already education programs going on which can be assumed to have some impact. Early years may show little impact due to the lag time described above. Nevertheless, over time it should be possible to get better data, and use that data to feedback into modifying the implementation of the plan.

Summary

Waste reduction programs are arguably the most important component of a management program for hazardous waste. Waste reduction is certainly the environmentally preferable approach and probably the most cost-effective approach to waste management. The Seattle-King County Hazardous Waste Management Plan developed estimates for waste reduction by waste type, and used these in developing the overall goals for waste diversion over the life of the plan. There are a number of programs designed to promote waste reduction, focussing on education, that have been included in the Seattle-King County plan. These include school programs, and education of consumers and other special groups. More can be done through legislation at the state and federal level. Manufacturers are also responding to changes in market demand and regulatory requirements. The results of these programs need to be evaluated over time to determine their effectiveness.

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Evaluating Commercial Alternatives to Hazardous Household Chemicals

Philip Dickey, *Washington Toxics Coalition**

As household hazardous waste (HHW) collection programs spread across the country, the public is increasingly aware of the health and environmental hazards posed by toxics in the home. This situation presents an excellent opportunity to draw attention to less-toxic products which are available. In the past most lists of recommended alternatives have consisted mainly of "do-it-yourself" recipes for household cleaners concocted of vinegar, baking soda, salt, and Worcestershire sauce, for example, or procedures for pest control utilitizing herbs, cayenne pepper, garlic, and beer. While some of these homemade brews work quite well, this approach will probably never appeal to a broad cross-section of the populace. When it comes right down to it, most people would prefer to go to the store and buy a product designed to do a specific job.

As more and more consumers look for environmentally safe products when they shop, manufacturers are producing products to meet this demand. These products are variously labelled as "non-toxic," "biodegradable," "natural," "safe for the environment," or "contains no [phosphates, chlorofluorocarbons, lead, or petroleum products]." Many consumers are understandably confused by the multitude of choices and sometimes conflicting claims

In order to provide guidance to citizens in our state, the Washington Toxics Coalition has undertaken a project to study the health and environmental safety of household products. We will screen available products against a set of predetermined criteria to obtain numerical ratings in several categories. Our goal is to create a computer database listing products which could be substituted for more toxic ones. The database can then be searched or sorted to extract lists of recommended products for different uses. This body of information will be used as the basis for public education programs to encourage hazardous waste reduction.

The project is similar in many ways to one being carried out in San Diego, California by the Environmental Health Coalition.[1] The primary difference between our project and theirs lies in the rating systems and criteria themselves. Another approach is being taken in Iowa, where hazardous household products are being labelled in stores.[2]

The project is in its early stages. Detailed criteria for rating products are being written and product information is being gathered. The purpose of this paper is to report on our progress and to stimulate discussion which may result in better criteria for evaluating the products.

Products to be Considered

The categories of products we are most interested in considering are those which comprise the bulk of HHW collected or which pose the greatest risk to human health or the environment.

** The Washington Toxics Coalition (4516 University Way NE, Seattle, WA 98105, (206) 632-1545) is a non-profit environmental organization which works in the areas of pesticide reform and hazardous waste reduction, including household hazardous waste.*

Table 1 shows some of these categories of household products. In order to limit our scope, we are primarily focusing on those products in each category which are marketed as safe or non-toxic (see column 2) or which contain ingredients generally recognized as substitutes for more toxic ones (such as those listed in column 3). It is hoped that this positive approach will most quickly identify products we can recommend. This initial direction should not be construed as an indication of bias in the rating process. It is merely a means to rapidly target the products which concerned consumers are most likely to be buying. As a check on the validity of the approach, some examples of products containing more-toxic ingredients will also be evaluated.

FIGURE 5.a

Categories of Commercial Alternative Products

Product Category	Alternatives to be Considered	Do not contain
Household cleaners	Soaps, biodegradable detergents	Synthetic detergents
Cleansers	Chlorine-free products	Chlorine
Oven cleaners	"No Fumes" oven cleaners	Lye
Spot removers	Labelled non-toxic or water based	Organic solvents
Glass cleaners	Products with vinegar	Ammonia
Mildew cleaners	Products with borax	Phenols
Polishes	Plant oil based, acrylics	Petroleum distillates
Paints	Latex or acrylic	Mineral spirits
Stains	Acrylic or urethane	Mineral spirits
Solvents	Citrus or vegetable oil based	Petroleum based
Paint strippers	Water-based	Methylene chloride, acetone, toluene
Wood preservatives	Copper or zinc, borax	Folpet, TBTO, penta
Adhesives	White glues, pastes	Naphtha, toluene, styrene
Inks/markers	Water-based	Volatile solvents
Insecticides	Insecticidal soaps, bacterials, botanicals, growth regulators	Organophosphates, carbamates, etc.
Herbicides	Salts of fatty acids	Phenoxy acids, etc.

Preliminary Rating Criteria

Establishing criteria for rating the products is the most important and difficult part of the project. We recognized at the outset that it would not be realistic to predict the actual risk of using the products. That risk varies greatly depending on where and how the products are used. Without doing extensive laboratory testing, there is no way to know the identity of all of the chemical compounds present in these products, particularly contaminants and trace materials. Toxicology data are not complete for many product ingredients. And risk assessment, even using state-of-the-art models, is still an approximate science. Therefore our goal was to establish a system for comparing the relative safety of different products.

It is desirable to make the criteria as quantitative as possible to avoid subjective judgements. In practice, however, there is a limit to the amount of quantitative detail which is useful. This limit is imposed by the availability of product ingredient information, toxicology data, or both. Thus there is a certain tradeoff between the scientific precision of the criteria, on the one hand,

and the usefulness of the criteria, on the other. The system we have chosen is an attempt to balance these factors to obtain valid criteria which can be used to make comparative ratings.

■ The Rating Scheme

The general areas in which we have chosen to rate the products are as follows:

- acute (short-term) toxicity
- chronic (long-term) toxicity
- physical and chemical hazards, and
- environmental impacts.

Every product will receive a rating in each category, the results designated by colors. Four colors are possible: green, yellow, red, or black, with green representing the best rating. A fifth color—white—indicates that insufficient information is available to determine a rating. The criteria are being written to provide the following general interpretation of the colors:

Green	Generally expected to be safe.
Yellow	Product poses some risks. Use with caution.
Red	Product may be hazardous. Should be used only if safer alternatives are not available and if recommended precautions for use and disposal are followed.
Black	Product likely to pose unacceptable risk. Not recommended.
White	Insufficient information to determine rating.

In most cases these rating classifications are broadly defined, encompassing an order-of-magnitude (factor of 10) range in toxicity or other quantity. Thus even fairly large uncertainties in toxicities would not change the results dramatically.

■ Acute Toxicity

To determine the product ratings for acute toxicity, we consider oral ingestion, inhalation, skin absorption or irritation, and potential to cause other acute effects. The product receives a rating for each route of exposure, and the final rating for acute toxicity is determined by the route which received the worst rating. Thus if a product were rated green for oral ingestion, yellow for skin, and red for inhalation, the final acute toxicity rating would be red.

The complete rating criteria for acute toxicity are given in Table 2. The product oral toxicities are either given by the manufacturers or are computed from the known toxicities of individual ingredients as compiled in standard sources.[3-4] For oral ingestion a simple ranking of the product toxicity is used, the assumption being that ingestion would be an accident, unlikely to occur repeatedly. For the other routes of exposure, contact with the product may occur on a regular basis. Particularly in the case of inhalation, the user may not be aware of the exposure—or at least of the danger it poses—and may continue to breathe the product for some time. Thus the criteria for inhalation attempt to estimate the likelihood that the product will be inhaled, as well as the effects that inhalation would produce. Considerable effort will be expended to estimate air concentrations, since they will be needed to evaluate both acute and chronic effects.

The standard of reference we are using for acute inhalation exposure is the Threshold Limit Value (TLV), a quantity designed for regulating workplace exposure.[5] However, we feel its use is justified here as a benchmark since it does address acute effects. The fact that home exposure is likely to be shorter in duration than workplace exposure provides an extra margin of safety.

FIGURE 5.b

Rating Criteria for Acute Toxicity

A. Oral Ingestion

Green	Product LD50* > 10,000 mg/kg
Yellow	LD50 between 1000 and 10,000 mg/kg
Red	LD50 between 50mg/kg and 1000 mg/kg
Black	LD50 < 50mg/kg

*LD50 is the dose which kills 50% of laboratory animals in a toxicity test.

B. Skin Absorption

Green	Not a skin irritant
Yellow	Mild to moderate skin irritant (causes reddening)
Red	Severe skin irritant (causes blisters or dermatitis)
Black	Skin exposure can cause death (LD50(skin) < 500 mg/kg) or permanent skin damage.

C. Inhalation

Green	Product not volatile or for all ingredients, normal use is expected to result in an air concentration less than 1% of the Threshold Limit Value (TLV).
Yellow	Normal usage results in air concentration greater than 1% TLV but less than 100% TLV.
Red	Normal use results in air concentration greater than 100% TLV but less than 10 times the TLV.
Black	Normal use results in air concentration greater than 10 times TLV or a foreseeable accident could result in air concentration greater than the LCLo.**

**LCLo is the lowest lethal concentration found in an inhalation test.

D. Other Acute Effects

Green	May be mild eye irritant, but can cause no permanent eye damage.
Yellow	Moderate to severe eye irritant, but no permanent damage.
Red	Severe eye irritant with potential to cause permanent damage.
Black	Acute exposure likely to cause permanent damage to eyes, skin, or other organs.

Some additional explanation is needed for Part C: Inhalation. This section of the criteria will be applied only to products used indoors or which are stored indoors and could potentially be spilled there. For purposes of calculating room air concentrations, it is assumed that products are used in a 9 x 12 x 8 foot room (25 cubic meter volume). Two types of use are considered: "normal use" and a "foreseeable accident." To define "normal use" for each type of product, a quantity of product and an effective application area will be defined. The amount of product can be assumed from label instructions for use or dilution or from an estimate of how much product would be needed to perform a typical task. The effective area is an estimate of the maximum surface area over which the product is likely to be spread during normal use. This area, together with the product vapor pressure and other parameters are needed to estimate the rate at which the product will evaporate. Some estimated normal uses are characterized in Table.

FIGURE 5.c

Normal uses for some types of products

Type of Product	Normal quantity	Application area	Effective area
Paint	gallon	walls, floor, ceiling	45 m^2
Glass cleaner	50 ml	1/4 wall area	8 m^2
Floor wax	200 ml	floor area	10 m^2
Paint stripper	400 ml	typical furniture	4 m^2
Household cleaner	varies	walls	30 m^2
Mothballs	24 balls	leave in room	.05 m^2

The expected air concentrations will be calculated by a model which takes into account the product ingredients, evaporation rates, and effective areas. If the product is extremely volatile, such as a paint or solvent, or if it is in aerosol form, the assumption will be that the entire volatile fraction evaporates. For less volatile materials, it will be necessary to do a more detailed calculation of the evaporation rate using a computer code such as the one recently described by Mehta et al.[6]

The "foreseeable accident" will normally consist of spilling the entire contents of the product container in the model room.

■ Chronic Toxicity

The factors to be considered in evaluating the chronic toxicity, physical/chemical hazards, and environmental impacts are listed in Table 4. Discussing the details of the criteria for each factor is beyond the scope of this paper, and detailed criteria have not yet been completed for all of the listed environmental impacts. Nevertheless a few basic points can be made. With respect to long-term health risks, cancer has been singled out as a disease of sufficient seriousness that the intentional presence in a product of any ingredient known to cause cancer in humans results in an automatic black rating. Carcinogenic contaminants (if they are known) also receive a black rating, but only if they are estimated to present risk above a certain threshold. This latter limitation is necessary to avoid spending too much time tracking down trace constituents.

The other main test under chronic effects is a comparison of the estimated dose from normal daily use of the product (as defined under acute toxicity above) with the Chronic Acceptable Intake (AIC).[7] This published quantity is derived from the lowest doses shown to cause chronic effects in animals and includes conversion factors for extrapolation to humans.

■ Physical/Chemical Hazards

This is the simplest and most straightforward part of the ratings. It measures product pH, flammability, and chemical reactivity. The latter two ratings are based directly on the National Fire Protection Association (NFPA) codes[8] if they are available. If NFPA ratings are not available, product flash points are used to determine flammability ratings. A key aspect of reactivity is the potential for chemical reactions with other commonly used household products. Chlorine bleach and ammonia would be downrated because they can combine to form a toxic gas.

■ Environmental Impacts

The biggest problem here is that the environmental impacts of most household products are unknown. Even if the impacts are known in general terms, quantitative measures may be lacking. In the case of the environmental impacts, it is likely that each category of product will have to be screened only for a subset of impacts. A laundry soap, for instance, would certainly be rated for persistence (i.e. biodegradability) and impact on water quality, while a glue would perhaps be rated only for disposal hazards. A pesticide would need to be rated for all the listed impacts. Impacts on water quality include the effects on municipal sewage treatment and septic systems from solvents and heavy metals present in consumer products which go down household drains in large quantities.[9] Work to quantify the environmental criteria is continuing.

FIGURE 5.d

Factors addressed by Chronic, Physical/Chemical, and Environmental Criteria

Chronic Toxicity	Effect of low level exposure over time (comparison of expected dose with Chronic Acceptable Intake); Presence of ingredients known to cause cancer, gene mutations, birth defects, fetal death, sterility, neurological damage, or other long term health effects.
Physical/Chemical	pH, flammability, and chemical reactivity.
Environmental	Toxicity to aquatic organisms and other wildlife including off-target species Environmental persistence Breakdown products Bioaccumulation Impact on water quality Disposal hazards

Sources of Product Information

Candidates for evaluation are being gathered from surveys of store shelves, catalogues, and personal recommendations. The initial source of information is the product label. Material Safety Data Sheets (MSDSs) are then requested from the manufacturers or distributors. In a few cases the information on the MSDS is adequate to make a rating. Usually, however, followup telephone calls are needed to elicit missing data. In many cases manufacturers are unable or unwilling to provide the information needed for ratings in all areas. For most products we do not have complete formulas. The worst case is probably pesticides, where undisclosed so-called "inert" ingredients comprise the vast bulk of the product. Several approaches are possible in this situation. One is to evaluate the impacts of the known portion of the formula and consider the result a lower limit rating (i.e. the product could not score higher than this, but it could score lower if the remaining ingredients were found to have substantial toxicity or environmental impacts). In the end, many products will receive "white" ratings in some areas, indicating that insufficient information is available. Even that rating will be useful to consumers, many of whom will choose to avoid products whose effects are unknown.

Sample Ratings

Although the final criteria are not yet completed, we have been doing some test ratings as a calibration process to see how well the criteria work. Already this process has uncovered some fatal flaws which had to be corrected. To illustrate how the criteria work, I have chosen to review three paint strippers. Paint strippers have traditionally been very hazardous products, usually labelled "Danger-Poison." They are strong skin and eye irritants and the vapors are dangerous to breathe. Recently a water-based paint remover has been available as an alternative. It is non-flammable and is labelled as posing little risk of inhalation or skin irritation. We were interested in particular to see how this product would compare to the other types of products. The three products we have chosen represent the major types of paint removers currently in use. The approximate formulas are given in table We are withholding the identities of the products at this time, since these ratings are very preliminary and the criteria are still incomplete. The final results could be somewhat different.

FIGURE 5.B

Principal ingredients in three paint removers

Product A	Product B	Product C
80% methylene chloride	40% acetone	24% dimethyl adipate
10% isopropanol	40% isopropanol	2% dimethyl glutarate
5% methanol	20% toluene	2% hydrated magnesium aluminum silicate
5% glycol ether		62% water

For purposes of evaluating these products, we consider that 400 ml of each is used in the 9 x 12 foot room for a period of 2 hours. This estimate is based on an application rate of 100 ml/m^2 and a work area of 4 m^2. Assume also that there is enough ventilation to dilute the air concentrations of the evaporated products to 1/2 of what they would be in the absence of ventilation. This is a reasonable estimate of what might occur if the product were used indoors without opening windows to provide adequate ventilation. Although the product labels do warn against using the products without adequate ventilation, the fact remains that many people do use the products in closed rooms. Buie et al.[10] describe a typical case of a person who "used [a paint remover] in a poorly ventilated area despite warnings on the container" and required hospital treatment. This incident underscores the reasoning behind evaluating these products under less-than-ideal conditions. For the worst case foreseeable accident, we consider that a 1 liter bottle of each product spills in the room with no ventilation.

In the interest of continuity, the details of the rating process are relegated to the Appendix of this paper. The results are presented in Table.

Summary of Paint Remover Ratings

Category	Product A	Product B	Product C
Acute toxicity	black	black	yellow*
Chronic toxicity	black	black*	red*
Physical/Chemical	red	red	green
Environmental	black	red	white

*ratings with the highest degree of uncertainty or sensitivity to model assumptions

Summary and Conclusions

While our criteria are still incomplete, it is possible to draw some conclusions based on this study of three paint removers. The criteria as defined do point up distinct differences between the products. Some of the results would change with different assumptions for what constitutes normal use of the products or different thresholds for defining the rating colors. The ratings marked with an asterisk in Table 6 are those which are most sensitive to such changes. None of these ratings would change, however, if the amount of paint remover used were either doubled or reduced by half.

It seems quite clear that both Products A and B are potentially dangerous, especially if used with poor ventilation as described here. Product A's extreme volatility and the presence of a suspected carcinogen at the 80% level are the major reasons for its poor rating. Product B received its black rating for acute toxicity on the basis of the foreseeable accident scenario, whereas Product A was rated black for both the normal use and accident situations. Product C seems definitely to be safer in both respects, largely because of its much lower volatility. It also is much less flammable than either of the other products. We should stress again that the ingredients in Product C are not as thoroughly studied as those in the other two products. It is possible that more serious health effects from these ingredients may be discovered in the future.

The environmental ratings are not yet very meaningful, since some major gaps remain in this section of the criteria. The results in Table 6 mainly reflect concerns over product disposal. A major focus of our work in the next several months will be to complete the details of the environmental criteria. In addition we will be refining our evaporation calculations and estimates of the quantities of product needed to perform "normal" household tasks. Once that is completed, we will begin comparative ratings of many other types of household products.

Appendix

Details of the Paint Remover Ratings

Product A

■ Acute toxicity

Based on the toxicities of the individual ingredients,[3] the expected oral toxicity of this product is estimated to be about 3000 mg/kg. This places it in the yellow range for oral acute toxicity. Based on label warnings, it can be safely assumed that the product is a severe skin and eye irritant, which results in a red rating for skin. We have no definite evidence that permanent eye damage could occur, so we give the product a yellow rating for other acute effects.

The primary inhalation risk from using this product is posed by the methylene chloride,[11] so we consider only that ingredient in the inhalation analysis. Since methylene chloride has a vapor pressure of 400 mm Hg at room temperature, it will evaporate very quickly. Using the method outlined by Mehta,[6] we find that if the product were spread over an area of one square meter, all of the methylene chloride would evaporate in a few minutes at most. In our room with a volume of 25 m^3, we estimate an average air concentration of around 2400 ppm. To test the sensitivity of this result to different assumptions as to how the paint remover would be applied, we made calculations for three different application methods: all at once (4 m^2 total area), or in working sections of one square foot and one square meter with the entire area covered in 2 hours time. In each case, we assumed 0.3 changes of room air per hour. The results for the time-averaged air concentration ranged between 1200 and 3600 ppm, with 2400 ppm as the average, in agreement with our rough estimate. This is 48 times the TLV (50 ppm) for methylene chloride. Our criteria put this product in the black range. Confirmation is provided by looking at the accident situation, which results in an expected room air concentration of 12,000 ppm, almost as great as the experimental air concentration which killed 50% of laboratory mice (LC50 = 14,400 ppm). This result also gives a black rating for inhalation. Based on the results above, Product A gets an overall black rating for acute toxicity.

■ Chronic Toxicity

Methylene chloride is classified as a Group 2B (possible human) carcinogen by the International Agency for Research on Cancer (IARC).[12] This gives the product an automatic black rating for chronic toxicity according to our criteria, and there is no need to even consider the other factors. However, it is worth noting that a 2 hour exposure to the predicted "normal use" air concentration of 2400 ppm would result in a dose to a 75 kg individual of about 16000 mg. There is no Chronic Acceptable Intake defined for methylene chloride. However we can get a rough estimate of what the AIC might be by looking at the AIC for methyl chloride, which has a similar chemical structure except that it has one instead of two chlorine atoms. Typically, the toxicity of organic chemicals increases with the number of chlorine atoms, but in this particular case methyl chloride is more acutely toxic than methylene chloride. The two chemicals have acute inhalation toxicities of the same order of magnitude (within a factor of 4).[13] The AIC for methyl chloride is 0.22 mg/kg/day, or 16.5 mg/day for our 75 kg person. If the AIC for methylene chloride were the same as that of methyl chloride, daily use of Product A would result in about 1000 times the acceptable chronic intake. Thus, daily use (as defined here) of the product would also result in a black rating. This result was not used to obtain the chronic rating, however, which is based entirely on the potential carcinogenicity of methylene chloride.

■ Physical/Chemical Hazards

Pure methylene chloride would be rated green for flammability, but the presence of 15% alcohol in this product gives a yellow rating. However, methylene chloride produces phosgene gas when it decomposes by heat, and cases of this happening have been reported in the literature.[14] Therefore, the product gets a red rating for reactivity. The overall physical/chemical rating is red.

■ Environmental Impacts

The most important category under environmental criteria for this product is probably disposal. Methylene chloride is listed in the State of Washington as an Extremely Hazardous Waste, the highest category. Under our criteria Product A gets a black rating for environmental impacts, regardless of how it scores in other areas.

Product B

■ Acute Toxicity

Based on the toxicities of the individual ingredients, the oral acute toxicity of Product B is predicted to be about 4200 mg/kg, in the yellow area. Skin and eye irritation give it red ratings in these areas.

By a wide margin, the most volatile of the ingredients is acetone, which has a vapor pressure of 216 mm at 20 degrees C. We estimate that the entire amount would evaporate from a square meter area in about 5 minutes. This gives an air concentration of 1300 ppm for "normal use" and 6740 ppm for a spill. Taken alone, this acetone concentration (twice the TLV of 750 ppm) would indicate a red rating. Calculated separately, the evaporation rates for toluene and isopropanol respectively are about 1/5 and 1/10 that of acetone. Still, they should all easily evaporate soon after application. This results in 200% of the TLV for toluene and 300% of the TLV for isopropyl alcohol. If the three chemicals produce similar acute health effects, we can add the percentages of the TLVs together[5] to obtain an effective 700%. According to our criteria, this would still be in the red range.

Looking quickly at the accident situation, 6740 ppm acetone is roughly 40% of the concentration at which deaths occurred in laboratory rats (LCLo = 16,000 ppm). Applying a 10-fold safety factor for inter-species variation, we predict a human LCLo of 1600 ppm. The accident air concentration exceeds this LCLo by a factor of 4. This gives a rating of black, which overrides the "normal use" rating just discussed.

■ Chronic Toxicity

None of the ingredients in Product B is listed as a known or suspected human carcinogen. The Chronic Acceptable Intake for acetone is 3 mg/kg/day, or 225 mg for a 75 kg person. In our normal use situation, a 2 hour exposure would result in a dose of 6400 mg. The dose is 28 times the AIC, qualifying for a black rating.

■ Physical/Chemical Hazards

The primary physical/chemical hazard with Product B is its flammability, which gives a rating of red.

■ Environmental Impacts

Comparing the disposal of Product B with Product A, we find that the only ingredient listed as an Extremely Hazardous Waste is toluene. Acetone is considered a Dangerous Waste, a lower category. Isopropanol is not listed as either "dangerous" or "extremely hazardous." Weighting the classifications of the ingredients by their percentages in the formula, the result is equivalent to a Dangerous Waste, which rates red for disposal.

Product C

Product C presents the problem that relatively little is known about the toxicity or the environmental effects of the ingredients it contains. It is clear that in some ways it presents less hazard than the other two products, but it is dangerous to assume safety because of the absence of data.

■ Acute Toxicity

We are given the acute toxicity by the manufacturer: > 5 mg/kg. This qualifies as a yellow. The MSDS sheet states that skin irritation is possible "on prolonged and repeated contact." It also "causes irritation of the eyes on contact." These are highly qualitative statements; however, we give the product a yellow rating for skin and eye irritation.

No Threshold Limit Values or Chronic Acceptable Intakes are available for either dimethyl adipate or dimethyl glutarate. However, the very low volatility of this product (less than 1% of the evaporation rate of water, as claimed by the manufacturer) indicates that it may be reasonable to disregard inhalation exposure, at least as a route of acute poisoning. Based on the claimed evaporation rate, we estimate the inhalation dose of dimethyl adipate from a 2 hour exposure to be about 100 times less than the methylene chloride dose from comparable use of Product A.

■ Chronic Toxicity

None of the ingredients is listed as a known or suspected human carcinogen. Aluminum silicate is considered an "equivocal tumorigenic agent by RTECS criteria"[3] because it has produced pulmonary system tumors in rats. While inhalation of this insoluble salt is unlikely from normal use of the product, a red rating is required by our present criteria. Dimethyl adipate has been clearly shown to cause birth defects in laboratory rats.[15,16] The lowest dose at which this occurred (TDLo) was 181 mg/kg. Under our normal use condition, the 2 hour dose is estimated to be about 2.3 mg/kg. In the absence of a Chronic Acceptable Intake, we use the lowest observed toxic dose reduced by a factor of 100 to give 1.81 mg/kg. The predicted dose is 1.3 times higher than this, resulting in a red rating.

- **Physical/Chemical Hazards**

The product pH is 7.0 and its flammability is rated as 0 by NFPA. No hazardous reactions are expected. Therefore, the physical/chemical rating is green.

- **Environmental Impacts**

At this time we have no information on which to base environmental ratings. We are forced to use the white rating here.

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THE REFORMULATION PROCESS

IV CONFERENCE ON HOUSEHOLD
HAZARDOUS WASTE MANAGEMENT

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October 1989

HAZARDOUS WASTE CAN BE REDUCED!

Manufacturing can and is already taking action.
My company has reduced their waste about 50% just the last four years. But it took a positive attitude and up-front financial commitment to get there. We also strongly believe in a program called W.R.A.P.- Waste Reduction Always Pays! Over the long run, you come out ahead on the financial ledger by minimizing waste.

Manufacturing can do its' part and provide a safe work environment for its' employees and make products that are safe for use and safe for the environment. The "tug-of-war" becomes to make existing products even safer without giving up the level of goods and services that society also wants.

In order to understand the process and limitations of changing a product (reformulation), you must first know about the process of making an original product. The following charts are for the total process for a pesticide from the idea for a need stage to the manufacture of the final product. I used a pesticide example because they generate many questions for household waste, and their development process is complex.

FIGURE 6.a

THE TOTAL PROCESS FOR A NEW PESTICIDE
(average situation)

YEAR		MILLIONS OF DOLLARS
1,2	SCREEN COMPOUNDS FOR ACTIVITY	10 - 15
	about 1000 compounds are screened to produce just one compound to be further developed	

3,4,5,6	TOXICOLOGY TESTING	4
	mice, rats, rabbits-- test for lethal dosage, no observable effect level, reproductive effects, tumors	
4,5,6	ENVIRONMENTAL FATE	3
	movement in soil, potential uptake by plants, effect of products of decomposition	
5,6,7	FIELD TESTING	10
	testing under conditions of actual use-- optimum dosage, various formulation combinations, delivery/application systems	
7,8	REGISTRATION	0.2
	submittal of health and environmental date for approval and registration by EPA and/or states - over 50 different tests (all pesticides must be registered)	
8,9,10	BUILD MANUFACTURING FACILITY	10 - 30
	modify lab process method until can produce on a large scale, then design and construct a new facility, or modify an existing plant	
10 years	TOTALS (average)	50

Now that we have a feel for the creation of a new product and its' extensive testing and registration, let's look at what is different with changing just the formulation of that same product.

The following numbers will greatly vary with the magnitude of the change. A change of physical state such as from a liquid to a solid is significant even though you're still after the same pest. The numbers also fluctuate with how much is known about the new ingredient (and how much the government knows!). If common ingredients are used which are already approved, the reformulation process is much quicker. However, the final product in this case may not be any better and it may not have any unique competitive advantage.

FIGURE 6.b

PROCESS FOR CHANGING THE FORMULATION OF A PESTICIDE
(average situation)

YEAR		MILLIONS OF DOLLARS
1,2	LAB EXPERIMENTS different carriers (solvents, granules, suspending agents) container design/compatibility. If the active ingredient is changed, the process in essence becomes that of a totally new product and back to "square one" and approach 10 years and $50 million	2
3,4	RETEST IN FIELD activity on target pest and on non-target areas, droplet size/drift, shelf life, compatibility with application equipment (plugging, corrosion), compatibility with in-tank mixes (reactions, precipitation)	2
3,4	HEALTH, ENVIRONMENTAL FATE, WASTE toxicology of new ingredients, products of decomposition of new ingredients, disposal of new container/ingredients,	1
3,4	MATERIAL SUPPLY AVAILABILITY reformulation may be so revolutionary that some supplies are not commercially available	0.5
5	RE-REGISTRATION re-evaluate data for new formulation, resubmit for approval to EPA, evaluate regulations for storage and transportation of reformulation	0.2
5	MANUFACTURING scale - up from lab to production quantities, modify existing plant if similar chemistry and packaging, build new plant if reformulation physical state is changed (e.g. from a liquid to a solid)	10
5 years	Totals (average)	15

Although I've used pesticides as my example, a non-pesticide would be roughly half the time and expense to develop or reformulate. A chart for a new non-pesticide could look like this.

FIGURE 6.c

TOTAL PROCESS FOR A NEW PRODUCT
(NON-PESTICIDE)
(average situation)

YEAR		MILLIONS OF DOLLARS
1	lab experiments, screening	7
2	toxicology studies	2
2	a few environmental fate studies (because products not usually applied to soil)	0.5
3	in-field testing	5
0	(no registration required)	0
4,5	build manufacturing facility (typically less complex)	10
5 years	TOTAL (average)	25

Similarly the reformulation process for a non-pesticide would be about 2 - 3 years and $5 - 10 million.

A question we pesticide manufacturers often get is "why not use biological controls in place of chemicals?" While another speaker will address this in more detail, I will mention a few key points on the difficulty of doing this.

BIOLOGICAL CONTROL CONSIDERATIONS

1. LITTLE DATA BASE - relatively new, not a lot of money spent, not a lot of successes, not a lot of people to compare notes with.
2. PUBLIC FEAR - perception that will create "Frankenstein" monsters
3. LACK OF PRECISE SPECIES - hard to raise "purebreds" in sufficient quantity at exactly the time needed
4. POOR APPLICATION METHODS - hard to put bacteria and beneficial predators exactly where you want them and for them to stay there and to eat only what you want them to eat
5. REMEMBER - pest-resistant plants create their own toxic chemicals.

In spite of the difficulty in making changes or creating new products, there are many successes in making products less hazardous. The following are only a few:

SUCCESSES

PESTICIDES	replaced zinc and mercury dusts with pyrethroids applied as a liquid
	less persistent and higher activity meaning less pesticide used and biodegrades faster
	packaging that is made of water dissolvable plastic
PAINTS	replacing lead and oil with latex
	less hazardous pigments and solvents
SOLVENTS	replaced xylene with solvents of higher flash points
	replaced methylene chloride with less hazardous solvents
	replaced carbon tet with perc for dry-cleaning
	replacing CFC in aerosols

In conclusion, while there are successes and will be many more, there is no "quick fix". It is important not to trade a small problem for a larger one. Industry is listening and responding to the challenge of waste. Society must be sensitive to the demand for goods and services from "industry". We will have to be partners if we are to have responsible waste management.

The Impact of Household Hazardous Waste Issues on Pesticide Product Reformulation

By William L. Chase, Jr.
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To begin with, one must recognize that a pesticide product has inherent toxicity for the target pest species whether it is a weed in a lawn, an insect in a house, or bacteria in a bathroom. What is, therefore, the purpose of reformulating a pesticide product? What may be the driving forces behind any reformulating of such a product? It is obvious that reformulating of a product must not have an adverse impact upon the efficacy of a product. The manufacturer of a household pesticide product must meet all of the requirements of the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) and any internal requirements before a new formulation can replace an existing one. The concept of toxicity reduction is complicated for household use pesticides since pesticides are toxic substances by definition. What can be done to reduce the hazard during use or disposal?

Reformulation can help in several ways. With regard to the first question of the purpose for reformulating a household pesticide product, there are many reasons why a registrant would want to change a formula. Companies have recognized that many issues, such as household waste disposal, the use of organic solvents as diluents or carriers, the EPA's concern about "inerts of toxicological concern", the expense of organic solvents, the desire to produce products with reduced acute hazards, changes in consumer needs, technological advances, and numerous other factors all have an impact upon the formulation of new products or the reformulation of old products.

Let's look, for a moment, at some of the factors that drive formulation changes and how they impact upon a manufacturer. The EPA is, as you are well aware, in the process of reregistering all pesticide active ingredients. The process was begun a number of years ago and in late 1988, the Congress imposed a new nine year time frame on completion of the reregistration process. The process has been ongoing for more than a decade and we have already seen many of the effects of reregistration. We have seen the loss of many active ingredients because of the high cost of generating new studies on older chemicals whose data bases were not up to the current guidelines. This has forced manufacturers to reformulate combination products as those affect active ingredients are voluntarily cancelled. We have seen a lot of reformulation activity when the EPA published its lists of inert ingredients of toxicological concern. Registrants were investing a lot of time, effort, and money into formulation improvement that most consumers were totally unaware of. Most of the active ingredients eliminated in the 1970's were those chlorinated hydrocarbon insecticides which were subject to concerns because of their persistence in the environment.

Reformulation of products is also resulting from state or regional concerns about such issues as the use of volatile organic solvents as diluents and the disposal of unused products. There are several states which, because of their inability to meet Clean Air Act compliance ozone levels, have targeted consumer products which contain volatile organic solvents for regulations. Since there are court actions which are now involved, there may be judges mandating reformulation of consumer products. In states where agricultural chemicals are now found in surface and sub-surface water supplies, concerns are being raised about the disposal of household products in sanitary landfills. Our basic premise here is that household pesticide products do not pose a special threat if the disposal instructions on the label are followed. Incidentally, the disposal instructions for disposal of empty pesticide containers and containers which still contain product were required by the EPA back in 1983. As a result of changes made in FIFRA in 1988, the EPA is conducting studies on package design and package disposal.

Manufacturers have recognized the changes in consumer trends also and are responding accordingly. In the area of indoor use insecticides, for example, many companies recognized the value of products that are ready to use. They require no mixing or measuring and since the amount of active ingredient used is much lower, the acute toxicity of the product is much less than a concentrate of that same active ingredient. The ready to use products represent an early step in the reformulating process. Many registrants offered ready to use products containing diazinon, chlorpyrifos and pyrethrum for controlling indoor pests such as cockroaches and fleas. The early products utilized high concentrations of organic solvents such as kerosene. Formula changes were made when water based technology was developed and microemulsions, invert emulsions, and microencapsulation came into greater use. With the change to the water based formulations and the development of barrier packaging reusable trigger spray bottles contribute to less frequently discarded packaging. In the area of bathroom products such as toilet bowl cleaners, products now have different formulations also. These are areas of successful reformulating which are responding to changing consumer needs and recognition of environmental concerns as well. When the product is properly disposed of, there is less active ingredient disposed of, however, we advocate use rather than disposal.

Manufacturers have also recognized the need to reformulate products which are used outdoors, as well. The reformulation process of outdoor use products has taken many forms for concentrated insecticides, fungicides, and herbicides. We have observed formula changes which have changed solvent systems, reduced the amount of active ingredients, and changed active ingredients altogether. Again, the main reasons to change the formula of a product reduce its acute toxicity or address environmental concerns. These reformulations are often made with little awareness on the part of the consumer. There are no banners across the front of the package advertising a "new and improved" formula. The only indication that a formula has changed may be in that the signal word on the product label has changed and the accompanying precautionary text has been revised.

Product reformulation also comes as part of the normal process of product improvement. As new emulsifiers, surfactants, solvents, and fragrances are developed, tested, and brought into the marketplace, manufacturers look at them to determine if and how they will fit into their product line. The same is true for active ingredients, although there are fewer and fewer new active ingredients coming along due to the higher development costs and longer time for the development of a new active ingredient. Recent data from a survey by the National Agricultural Chemicals Association indicates that new pesticide active ingredients are taking an average of eight years to develop and the cost is in excess of $40 million dollars.

I have brought with me today an example of a product which was developed to address concerns such as organic solvents and exposure during mixing and measuring of a product. The product is ORTHENE Systemic Insect Spray. It is an insecticide labeled for outdoor use on many ornamental plants. The product is packaged in a cardboard box which contains eight packets. Each packet would be added to one gallon of water. The cardboard box is, recyclable. The packet containing the product is an aluminized mylar film which cannot be opened manually - it must be cut open with scissors. Inside the packet is a PVA packet which contains the active ingredient. The packet is simply cut open and the PVA packet is deposited in a gallon tank sprayer or into a hose-end sprayer. The packet dissolves in the water and you are ready to spray. The active ingredient is completely water soluble. There are no organic solvents and the user never measures or is exposed to a concentrate which could spill or blow away. The positive aspects are obvious. This product was test marketed in 1974-1975 and it was not accepted by the public. It was obviously too many years ahead of its time as the manufacturer reformulated to conventional liquid formulations because consumers did not see the benefits offered by this product. Maybe it is time to look back at a 15 year old product which did not succeed to see if today's marketplace will be more accepting. The reformulation back to a traditional liquid formulation took several years of development and then the EPA registration process before the "new" conventional liquid product could be marketed.

As I look into the future, I believe that it is safe to say that household, personal care, automotive, and other specialty chemical products will undergo formula changes as new technologies and packaging are developed in response to changing marketing forces and regulatory needs. Research is ongoing in the area of pesticide products which may give us even more single unit, water soluble packaging which will require considerable reformulation research. It must be obvious that unique chemistry features of each active ingredient will have to be paired with the developing surfactant and emulsifier technology to give us products which will be safe amd efficacious as present technology will allow. The ideal outdoor use pesticide product could be one which can be used in a tank or hose-end sprayer and is packaged in a water soluble sachet. The product would be packaged in a paper container which could be recycled when empty.

Indoor use products such as insecticides, hard surface disinfectants, and sanitizers could be in similar packaging and the active ingredient packet could be added to a reuseable bottle with a trigger sprayer. Again, the use of a cardboard box or paper bag would provide a recyclable package. As far as indoor use disinfectants and sanitizers, the product waste or unused product that was to be disposed of could simply be flushed down the drain since that would be the method of use for the product.

Reformulation of pesticide products designed for household use has taken place in response to many factors. Reformulation is a constant ongoing part of product research and development. People who supply the household insecticides, fungicides, herbicides, sanitizers, disinfectants are constantly searching for better formulations that are safer and easier for people to use and dispose of when they are through with them. People buy these products because they have value and benefit. They do not buy a product to throw it away. We who are represented by the CSMA believe that the best way to dispose of a product is to use it and we encourage people to use rather than throw away. We live in a world that has encouraged a throw-away mentality. Certainly, all of that thinking is behind us and we are all being more responsible and responsive users of our resources.

"Developing a State-Mandated Planning Process"

by
William P. Green
Washington State Department of Ecology

for
4th National Household Hazardous Waste Conference
November 6-8, 1989 Orlando, Florida

The first efforts in household hazardous waste management in Washington state began around 1982. These efforts were studies and collection events held by a few local agencies. In that same year, the state requested all local governments to prepare a section on hazardous waste management as part of the local comprehensive solid waste management plan. This request was not widely complied with. Objections included the lack of resources and expertise in local governements.

These issues were combined with concurrent issues in the siting of hazardous waste management facilities, and an eighteen month planning effort ensued with a statewide committee to address the issue. This planning effort resulted in amending the State Hazardous Waste Management Act (RCW 70.105). The major amendments include the following:

The state would have pre-emptive authority over the permitting and regulating of hazardous waste incinerators and land disposal facilities, to include waste piles, surface impoundments, landfills, and land treatment facilities, management of "regulated" generators, and oversight in the development and implementation of local programs. Local governments would be responsible to re-zone for hazardous waste treatment and storage facilities and planning for moderate risk waste--defined as households and generators conditionally exempt from regulation.

About 50% of the state complied with the zoning requirment by the deadline of June 30, 1988. The deadline has been extended to November 1991.

The act which resulted from these issues passed in 1985, but with the caveat that the requirements therein would not be mandatory until appropriations were passed for these programs. Said appropriations were made in 1987, the same year as the planning guidelines were promulgated. Since that time, an ever-increasing number of local governments are involved in the planning process. The plans are generally regional in nature, with a county or group of counties preparing the plan and including all cities therein. One plan has been approved, with others to follow soon.

I would like to focus on what I think makes the Washington system go. There are four major areas that characterize the system: the use of specific guidelines, an assistance program from the state to the locals, flexibility in measuring compliance, and the active use of citizen's advisory committees.

Let me work a little in reverse order. First, I will discuss the advisory committees and then work my way up. It was realized early on that to impact HHW, we could not have a "top down" program. It is impossible to enforce or motivate 4.5 million people that way. So, we formed the advisory committees to get public participation and buy-off as early on in the planning process as possible. The work of these groups has been excellent, and has given to the planning process both momentum and innovation. In a few counties, the committee has participated in the actual data gathering in order to educate themselves.

Washington's counties are very diverse and independent, thus, a single set of detailed rules may not work for all areas. Some flexibility on the part of the oversight agency is needed, particularly in two areas: the design of the planning process and financing of the final program. In Washington, we have drawn upon what we call the jurisdiction-specific requirement. This is an agreed upon agenda for an area that is basically the same state-wide, but has been custom fit. An example is one area with a population of 10,000, but an annual tourist population of over 300,000. That particular area is looking into the tourist waste stream. Another group of counties is looking into agricultural wastes.

Financing the process also varies from area to area. Some use solid waste fees, others include sewage as well. Others are using general funds. It is realized that a stable source of dedicated funding is necessary for the system to survive. A local add-on to the State's Hazardous Substance tax is favored by many, as well as an annual generator fee of $25 for small business programs.

To aid in the development of MRW prgrams, an assistance program was designed. The assistance was provided in two areas, financial and technical. In the financial assistance program, the state paid 75% of the costs of planning, and 50% of the costs of other projects such as collection days. This was essential to some of the financially distressed areas of the state, who could not have afforded a plan otherwise. It was also useful in increasing the quality of the plans.

One of the reservations of many counties in getting involved with MRW was a lack of expertise. In response, Ecology dedicated staff to technical assistance. Under the program, an

Ecology staff member is assigned to each county, and meets with them at least quarterly to assist in plan development. The assigned Ecology staff is also a member of the citizen's committee for that county, as well as oversights the internal review leading to approval. He/she has two major tasks: "prevent re-invention of the wheel 39 time" by expediting information sharing between counties, and "smoothing out the approval process" by facilitating conversation between local and Ecology staff.

There are additional Ecology staff to assist with special projects and collection days, providing both written guidance and on-site assistance. A telephone hotline for businesses and one for households is also available as well as specific technology transfer through our Office of Waste Reduction, established by the 1987 Legislature. As previously stated, the assistance increased both the quality and quantity of the plans produced.

Finally, the Guidelines. As required by the Legislature, Ecology prepared guidelines to assist local governments in preparing plans. The guidelines are a great base on which to build a program, in that it contains detailed information that is useful in the preparation of the plans. For example, there is an eighteen step process described that will result in a final plan. The five program components and minimum qualifications for approval are listed with detailed examples provided. Also, the waste management priorities are emphasized. Most importantly, the state and local roles are delineated. It would seem with these guidelines that there would be a conflict with our stated purpose with flexibility. The Legislature, however, granted Ecology the authority to waive any requirement if the local government "met the intent of the law".

So, what are we getting? First and foremost, we now have 40 counties doing plans (one from Idaho). The early programs that began in Seattle and other areas are moving out as this becomes a truly state-wide program. Second, we are getting innovative and high-quality plans, showing a high level of local committment. Let me show you just three of the proposed programs: King, Snohomish, and Clark-Skamania (attached).

In way of explanation of the "snapshots", all data are 1989 estimates. Area is in square miles. Below the population/area are the waste generation rates for household and small businesses: these are expressed in tons/year. The program area shows budget for 1989 and projected years for the full MRW system (above) and households (below). Finally, elements representing significant and new proposals are delineated. As can be seen, many of these proposed projects are quite revolutionary.

In summary, the Washington system for MRW management relies on four actions taken from the state level (and many more at the local level): 1-Specific roles; 2-Specific guidlines; 3-Maximum appropriate assistance; 4-Flexibility.

FIGURE 7.a

Snapshot

KING COUNTY

Pop: 1,414,000
Area: 2,140
Major City: Seattle
(Pop. 496,000)

HHW: 6,300
Small Business: 12,700

Program

1990: $3.7 million
2009 : $11.3 million
HHW: $1.8 million
2009: 8.7 million

Elements

- School Program
- Hazards Lines
- Hazard Free Neighborhoods
- Permanent Collection Facilities
- Pick-up Service for Homebound
- Targeted Waste Collection and Recycling
    - Latex Paint Recycling

FIGURE 7.b

Snapshot

CLARK-SKAMANIA COUNTIES

Pop: 222,300
Area: 2299
Major City: Vancouver
Pop: 43,300
HHW: 1250
Small Business: 1500

Program

$665,000 1990-1994
HHW: 55,000 (1990) 84,000 (1994)

Elements

- Hazardous Waste Week
- Home Business Education
- Collection Facility (2)
- Collection Days (2)

FIGURE 7.c

Snapshot

SNOHOMISH COUNTY

Pop: 430,000
Area: 2096
Major City: Everett
Pop: 60,100
HHW: 3950
SQG: 352

Program

$8.2 1990 thru 1995

Elements

- School Program
- Telephone Hotline
- Product Labeling/Point of Sale Materials
- Paint Exchange
- Battery Recycling
- Central Collection Facility
- Drop-off Sites (10)
- Collection Days (2/yr. min.)
- Land Check Program

State Oversight of Household Hazardous Waste Programs

by Caren Trgovcich

The management of Household Hazardous Waste (HHW) in the solid waste stream has largely been ignored across the country until this last decade when two major facts were recognized:

1. Many problems identified at solid waste sites across the country were determined to have their origins in chemical constituents which may be of household origin; and,

2. The complex mixture of chemicals utilized in household products has increased significantly to meet new product demands of the public.

Regulatory agencies, at the Federal, State and Local level have struggled with the need to address both the problems posed by potentially hazardous household products and the inability of regulatory agencies to deal with this issue. Many causes have contributed to this difficult problem including:

- a lack of Federal direction when the material is considered to be of residential origin;

- insufficient statutory authority;

- overlapping jurisdictions; and,

- inadequate funding to deal with a problem whose costs are approaching commercial scale hazardous waste remediation costs.

Local officials are attempting to address the myriad of public inquiries regarding HHW and the need to provide organized assistance to divert such materials from the solid waste stream. State agencies are struggling to find the resources to assist local governments and, at the same time, must attack the issues of proper disposal, permitting and siting, which may ultimately inhibit the expansion of such diversion programs.

California was presented with a unique opportunity during this last legislative session: State legislators, upset over the inability of existing agencies to address the impending crisis of too much garbage, too few regulatory controls, and no long-term planning effort, set about to create an agency with the ability to look at the solid waste crisis with an integrated management approach. This new agency, the California Integrated Waste Management Board (Board) has been given the lead responsibility for solid waste, including household hazardous waste programs, all planning and development functions as they relate to reduction and recycling in the solid waste stream, and the ability to develop a fee structure which would address materials as they are produced and purchased.

The tasks which the new Board have been assigned will require an extraordinary amount of effort to achieve. Not only does California produce almost 40 million tones of garbage a year (which equates to 2500 pounds per capita), but the immense area that the State covers requires a well planned approach utilizing all levels of government to achieve very ambitious resource reduction and recycling goals.

The HHW program is already benefitting from these changes. First, the new laws have recognized that only through public education and thus behavior modification, can we expect to see a change not only in the public's attitude towards the disposal of household toxic products but in the public's choice to purchase certain products. The new Board will be working with the Department of Education to develop materials and curriculum to be used in the classrooms for courses designed to educate our children on alternatives to, the safe use of and the proper disposal of HHW. A statewide network of information exchange has been established to assist local agencies and other public and private organizations in the dissemination of safe use, disposal and alternatives information. The Board has just completed the development of its first HHW Public Service Announcement (PSA) which is the initial step towards educating the public on these materials and providing them with access to the statewide network of HHW information. Not unique to California is the need to provide educational materials, such as the PSA, to communities where English is not the primary language. The need to establish a bilingual program which will provide educational materials to this growing population need to be addressed.

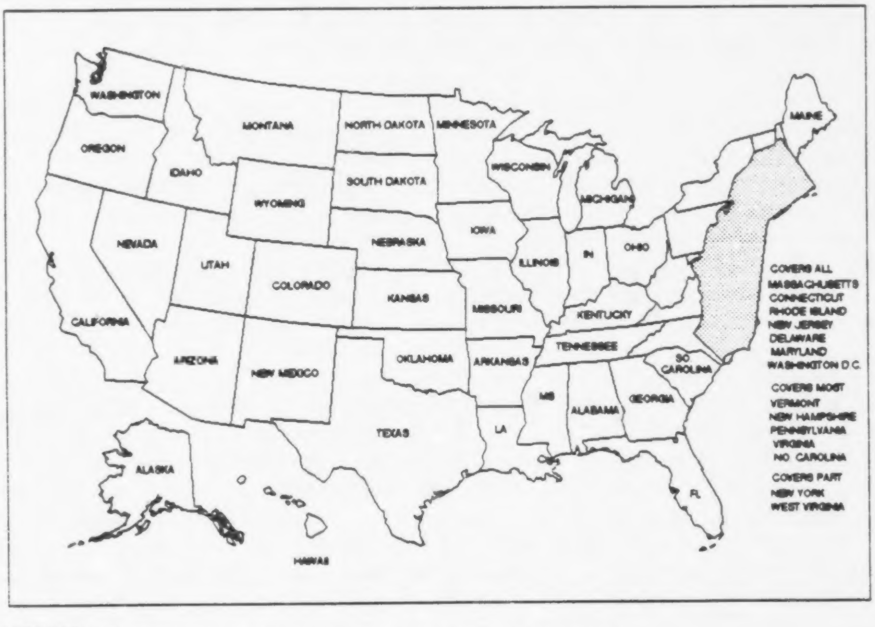

FIGURE 8 Compares California with the Eastern Seaboard

A significant local planning effort is currently under development which is intended to provide local governments to plan for future management of solid waste in an integrated manner. These plans, which are called Countywide Integrated Waste Management Plans, will require that planning efforts address all elements of the solid waste stream from not only a disposal perspective, but with emphasis on the need to reduce the amount of material generated as waste material and the need to recycle materials which may end up in the solid waste stream beyond our current capabilities.

A specific HHW element will be included in these plans. The law ensures that local governments not only address the need for proper disposal methods and public education to further this concept but requires that HHW programs be designed with a primary emphasis on reduction and recycling strategies as well. We will attempt to take the planning process one step farther than we have in the past by assisting local governments in implementing the programs which they have outlined in their planning process.

A major effort is needed in California in more rural areas which not only do not have the funding capabilities to establish or support HHW programs but which do not have a common method of collection or disposal upon which to rely for diversion or recycling activities. The Board's new duties will also include the administration of a grants program which will attempt to meet the needs of existing local HHW programs and promote the establishment of new programs where funding requirements must be supplemented. The initial dollar amount for this grants program will undoubtably be determined to be insufficient for the needs of the state, but the new Board will hope to demonstrate the need to increase the funding most importantly to areas without existing programs.

The key to successful implementation of all of the efforts which I have described is, of course, money. To initially fund this undertaking, each landfill operator will be assessed a fee of a dollar a ton. However, the California legislature was very clear in stating that this disposal fee should be amended by other forms of funding. The new Board is specifically tasked with developing a disposal cost fee system on goods sold in California which are normally disposed of in solid waste landfills by mid-1991. This method of funding promotes the principle that the costs associated with the manufacture, sale and disposal of a product should be borne entirely by the product and not any other unrelated handling methods.

There are several issues still remaining which we have yet to tackle in California. Most notable is the ultimate handling of HHW as a hazardous waste for purposes of disposal. The California Department of Health Services is responsible for the permitting, where required, of HHW collection activities. An especially difficult issue to address is the incidental handling of hazardous materials, as HHW, at solid waste facilities. While it is necessary for the State to establish a baseline for performance, it is also the State's responsibility to promote the diversion of HHW from the solid waste stream. These two concepts may end up on a collision course if the regulatory programs do not treat HHW in a manner different than commercial hazardous waste. What we are now understanding is that government agencies must rely on each other's expertise and work together to create an environment which promotes a variety of HHW programs: such as reduction, diversion, and recycling activities.

Planning Household Hazardous Waste Collection Programs

Leslie Lewis
Citizens' Participation Coordinator
Connecticut Department of Environmental Protection

Where do I start? This is often the first question that the planner of a household hazardous waste program has. Planning is an important step in the development of any program. Without prior planning and coordination, no amount of money or good intentions will ensure success.

So, where do you start? By gathering all potentially interested parties together to discuss your proposal. Begin with government agencies, local and /or county. Invite CEO's, environmental personnel, health departments, public works, fire, and police representatives. City councillors or aldermen from the area where the collection will be held should also be notified. Next, contact environmental groups, public interest organizations, service clubs and the like. Extend an invitation to your local board of education or superintendent of schools. Finally, reach out to local business and industry leaders.

Let us assume that all of the above-mentioned people have attended your first meeting and they all agree that this is a worthwhile project. Your next step should be to contact your state environmental agency to see if you will need any special permits to collect HHW. This is especially critical if you are planning a permanent facility. Permit requirements will be more stringent and will probably increase the amount of lead time you will need before the facility is operational. The state agency may also be able to offer you technical and/or financial assistance and a list of contractors who are qualified to service your project.

You should contact other towns, counties, or states which have had experience with the kind of collection program which you are proposing. Their knowledge should help you to avoid the problems which can sometimes occur. They should also have first-hand information on the contractors which will prove valuable when you bid out the job.

Now that you have laid the basic groundwork for your project, you are ready to tackle the biggest problem you may face -- money. HHW programs are expensive, and it is important to determine how much money you will need and where it will come from. Municipal or county budgets may be adequate to cover all costs. If not, grant funds may be available from the state or from private foundations. You may be able to get donations of either money or in-kind services from businesses or civic organizations. User fees could be levied on those household which participate in the collection. If you are looking at long-term financing for a permanent facility, look into tipping fee surcharges, per capita assessments, or dedicated taxes.

Once your funding options are in place, the next decision you need to make regards siting the project. In most cases it is advisable to use local, county, or state-owned property. Look for a site that offers ease of access, lots of room, and is well-known by the community you propose to serve. Private properties such as shopping centers, stadiums, and corporate facilities are possibilities as well. If the facility is going to be permanent, you will need to take into consideration safety, local fire, building, or zoning requirements, and site security. While your siting decisions are being made, make sure to involve local citizens and politicians. Don't let them be the last to know what is being planned for their neighborhood.

Now, you have the funding and you have a site. It's time to find a contractor to handle the HHW generated by your program. The firm must be licensed by your state to transport hazardous waste, and it must have access to permitted transfer, storage, or disposal facilities. As stated earlier, your state agency may maintain a list of firms which are both qualified and interested in handling HHW. Check to see which firms have done other collections in your area and find out how they performed. Develop your RFP (request for proposal), making it as specific as possible. Ther are many examples of RFPs available from towns and counties around the country. Don't be afraid to copy other people's good ideas. When you get the bids back in, go over them carefully. The low-bidder on paper may actually be more expensive in the long run. The RFP for a permanent facility will be more involved, and the options will be more numerous. For instance, will the bidder supply the building and physical plant, or will the contractor be asked to include this as part of the total package? Who will receive the waste from the public, the contractor or local employees? If local personnel are receiving, will the contractor provide training? All of these questions should be dealt with at this stage in the planning process.

Once the technical and logistical problems of how much, where, and who have been hammered out, you are faced with your next challenge -- getting the public to participate in your program. Get the media involved early in the planning process. This can help to generated support for the project. Both print and broadcast coverage of your program are important, and don't forget about community access television stations. Schools can be an excellent communications outlet for both parents and students. Your group should have a spokesperson who can address town meetings, civic organizations, and the like. Flyers and brochures can be placed at libraries, post offices, and other public buildings. Stuffers can be prepared for placement in shopping bags in supermarkets. Posters may be placed around town. Information can be included in utility or tax bills. Finally, for those areas which can afford it, direct mailing is a very effective means of getting the word out.

Permanent sites will need an institutionalized public information and education effort in order to maximize participation. In addition to the techniques mentioned above, other "gimmicks" such as magnets, key rings, and bumper stickers may be utilized.

Finally you arrive at the big day, the collection or the opening of your permanent facility. What do you do with all of those people once you have them there? Make sure that you have enough personnel, whether they are volunteers or professionals, to handle the tasks at hand. They should be easily identifiable on-site, and there should be one person with overall authority over the event. All of the emergency services in the community should have been notified about the program. It is also important to make contingency plans in case you run out of funds before the collection is scheduled to end. You may be able to get an emergency authorization to spend more money, or you might have to distribute a letter stating the reasons for the shut-down, but you should be prepared for either eventuality.

You might think that, with the collection over or the facility established and running, that your job as a planner is over. If only life was so simple. While the memory of what went right (and wrong) with your collection is still fresh, organize a "post-mortem" to go over it. This can also give you an opportunity to say thank you to any volunteers who helped with the project. For a permanent facility, meetings should be held on a fairly regular basis to discuss the on-going operation and any changes or modifications which might be needed.

One thing to keep in mind regarding HHW is that collection is not the only option. Collection msy not be feasible for a number of reasons. You must then consider how your community should handle the problem. For instance, many materials which people want to dispose of are still useful. There may be local community centers, halfway houses, or homeless shelters which could use paints and cleaning products. Car clubs might be interested in automotive products. Low-hazard pesticides could be given to garden clubs. Some states have developed manuals which can be used to determine the best disposal options for a variety of products when HHW collection in not available. Since the long-term goal of any HHW program should be to reduce the amount of material which will ultimately need disposal, education and publicity programs should include information which will help the consumer select the least hazardous products for future use.

There is on old joke about how to get to Carnegie Hall -- practice, practice, practice is the answer. In HHW management, the secret to success is planning, planning, planning. There will always be things that crop up which you didn't anticipate, but if your planning is sound you should be able to make the necessary adjustments with a minimum of trouble.

HHWM IV CONFERENCE
FACILITY/SITE OPERATIONS

by Michael Borden

INTRODUCTION

It is almost an impossible task to cover this subject in only fifteen minutes. Therefore, I have presented an outline which touches on all the fundamentals of Household Hazardous Waste Collection. Since "Operational Planning" is crucial to the success of a program, the main focus has been concentrated in this area.

The key emphasis is on staying in control at all times. The hard part is accomplishing this. It is important to understand your objective. Good planning and organization are essential.

Additionally, an experienced contractor and quality personnel are required. Contingency plans are an absolute necessity. Staffing, site capacity, materials and supplies are all key elements requiring great flexibility depending upon a number of factors.

A good rule of thumb is "stick to the basics" whether you are handling thirty drums or one thousand drums. The easy part, if all of the above have been properly addressed, is the actual operation.

FACILITY, SITING AND OPERATIONS

In order to ensure a successful operation, the following must be established:

I. DECISION PROCESS

- A. Consider Origin of Program/Determine Needs/Establish Direction
    1. Homeowner Requests
    2. Landfill Protection/Restrictions
    3. Regulatory Compliances
    4. Public Affairs
    5. Political Pressure
- B. Establish Mission Statement/Purpose
    1. Decide Short Term Goals:
        - a. Develop public awareness/education/clean-up program
        - b. One shot operation
        - c. Trial/test program
        - d. Determine the feasability/interest
    2. Decide Long Term Goals:
        - a. Multiple events
        - b. Multiple days
        - c. Permanent sites

FACILITY, SITING AND OPERATIONS

I. DECISION PROCESS (Continued)

        d. Door-to-door collection
        e. Reclamation/recycling
        f. Convert to non/less hazardous

    3. Determine Desired Outcome

        a. Amount of material
        b. Number of cars
        c. Cost of program (estimate)

C. Develop Chain of Command

    1. Define Roles/Responsibility (Which Entities are Involved?)
    2. Determine Which County/City Department Will be the Lead
    3. Assign Tasks - Municipalities vs Contractor

* Organization * Publicity * Operational * Disposal *

II. PLANNING PROCESS

A. Pre-Planning Meeting

    1. Establish Type of Program

        a. Individual drop-off, door-to-door, round-up
        b. Calculate program size.

    2. Individual Assignments

        a. Evaluate public education/awareness
        b. Determine site location considering:

            * Close proximity to population base
            * Well known by residents
            * Good traffic control (avoid cross traffic, stop lights, plenty of staging areas, etc.)
            * Paving
            * Utilities and lighting
            * Emergency access

    3. Contracting (Evaluating Bidders)

        a. Experience (HHW)
        b. Reputation (HHW)
        c. Capable of estimated program size
        d. Alternate handling methods (costs)
        e. Flexibility - contingency
        f. Manpower

II. PLANNING PROCESS (Continued)

4. Permitting - City vs Contractor
    a. EPA Number
    b. Extremely Hazardous Permit
    c. Out-of-state permits (Ill. EPA #)
    d. Variance/operations plan
    e. Contingency plan

5. City/County Requirements
    a. Traffic control - direction, signs, etc.
    b. Site authority
    c. Surveys
    d. Press/public relations

B. Operations Planning

1. 9-Week Planning Process - Best Case

2. Key Task Planning Including Contingency
    a. Personnel: Establish total number; job descriptions; and actual assignments
    b. Personal Protective Equipment (P.P.E.) based on a above
    c. Food, lodging, and travel.
    d. Permits
    e. Materials: Drums, absorbent, labels, visqueen, emergency and first aid supplies
    f. Equipment: Tools, compactor, pouring/decanting equipment, emergency, shower and eye wash, clean-up equipment, drum dolly, and forklift
    g. Transportation
    h. Disposal: Regular, special wastes (may need temporary storage for approvals), and empty containers

C. Pre-Operations Meeting

1. Job/Authority Assignments (Key)
    a. Contract Officer (City)
    b. Project Leader (Contractor)
    c. Safety Officer/(Contractor) Emergency Response
    d. Traffic Control (City)
    e. Receiving Leader (Contractor)
    f. Lead Chemist (Contractor)
    g. Drum/Manifest Control (Contractor)
    h. Administrator (Contractor): Inventory control, time sheets, food & travel, and accommodation cash

III. ACTUAL OPERATIONS

2. Review Operational Flow

    a. Traffic flow in/out
    b. Unloading material: Question resident about special handling or unknown material
    c. Packaging
    d. Transportation and disposal
    e. Site protection and clean-up

3. Review Site Safety and Emergency Plan

A. The Set-Up

1. One Day Prior to the Event (or at least 1 to 2 hours before start time):

    a. Prepare to start ahead of schedule if line is forming
    b. Traffic signs and cones:

        * Lots of stacking lanes.
        * Clear directions.
        * No crossing of lanes
        * Express lanes (oil or paint only)
        * Emergency lane

    c. Easy access to materials and transportation
    d. Pre-open and label drums
    f. Set-up the following key areas:

        * Receiving
        * Staging
        * Sorting (hazard class), separation of incompatibles
        * Decanting and compacting
        * Donning - doffing area
        * Haz-Cat unknowns area
        * Transportation (loading zone)
        * Designate employee lunch and parking area
        * First aid/emergency response

2. Tailgate Safety Meeting (Prior to Start)

    a. Announce who's in charge/safety officer
    b. Explain location of key areas
    c. Outline evacuation route
    d. Packaging area restrictions:

        * Authorized personnel only with P.P.E.
        * No food/drink
        * Follow load instructions

FACILITY, SITING AND OPERATIONS

III ACTUAL OPERATIONS (Continued)

f. Watch out for traffic
g. Residents stay in car
h. Proper P.P.E. for each area:

- * Receiving and Packaging require Tyvek; safety boots; nitrile gloves; hard hat; half-face respirator; and eye protection

- * Decanting requires poly-tyvek; and full-face respirator

i. Take breaks - avoid heat exhaustion/fatigue

* Restate Mission or Purpose *

C. Start-Up Operations

1. To Eliminate Initial Confusion:

a. Set pace; waiting time for residents should be 15-20 minutes maximum

b. Adjust personnel assignments based on turn-out

* Heavy - all receive (stage)
* Medium - receive and sort
* Light - receive, sort, and pack

2. Drum/Manifest Control is Critical or Confusion/Delays Result

3. Haz-Cat Decanting after Receiving is Over (Public Gone)

4. Manifesting and Loading

5. Site Clean-Up

D. Post-Operation Meeting

1. Discuss Positive and Negative Reports

2. Next Program

3. Invoice

HEALTH AND SAFETY

Larry Sweetser, Environmental Compliance Program Manager, Norcal Solid Waste Systems, Inc., San Francisco, CA.

Successful HHW projects depend upon preparation for the unexpected. By learning from the experience of others, communities can have contingency plans in place. He warns, however, that it is impossible to plan for all problems, especially because of the intense nature of a collection day.

PREPLANNING

Sponsors should consider the following preplanning guidelines:

A. General Considerations

- o Identify the entity accepting status as hazardous waste generator.
- o Identify the project coordinator.
- o Assemble a project team (sponsors, management, hauler) to develop the project.
- o Contact the disposal site to ensure ability to accept all collected wastes.
- o Determine if any recycling is going to occur: this can greatly affect the flow of waste and safety issues at the site.

B. Permitting Considerations

- o Obtain approvals from all relevant state and local agencies.
- o Adhere to an operation plan.
- o Design flexibility into the plan to adjust to situations that arise during the collection day.

C. Public Education/Notification Considerations

- o Stress safe packaging and recommended transport.
- o Indicate wastes accepted and excluded from the project.
- o Provide instructions for participants prior to arrival at the site.

- Provide a telephone number for additional information.

D. Site Location Considerations

- Accessibility/familiarity to target area participants

- Access from main roads

- Non-obstruction with existing traffic flows

- Considerations for traffic at the site
  - excess traffic handling
  - worker parking
  - entrance area and egress
  - waste receiving lanes

- Available resources
  - impervious surface
  - storm drains, wells, streams
  - communications: telephone, radio
  - sanitary/decontamination facilities
  - shelter from inclement weather
  - power supplies
  - lighting

- Insurance

E. Site Personnel Considerations

Many people will be needed. Specific jobs must be assigned.

- Volunteer vs. hired staff

- Identification of personnel in authority

- Numbers of workers

- Qualifications

- Responsibilities

- Training

- Information packet

F. Equipment Considerations

- Checklist of equipment (from drums to pencils)

- Contingency plan for getting forgotten or additional supplies, especially since many projects are on weekends

- Identify sources

- Arrange for arrival at the site

G. Waste Handling Considerations

- Flow of waste on the site

- Excluded waste contingencies

- Non-resident participation

- Acceptance of waste from businesses or non-profit groups

- Disposal of non-hazardous waste

- Establish recycling procedure, if applicable

H. Emergency Response Procedures

- Pre-notification of local agencies

- Established procedures

- Designation of on-scene coordinator

- Training of site personnel

- On-site assistance vs. on call: health department, haz-mat vehicle, police, fire, bomb squad

I. General Health and Safety Issues

- Personal protection
  - -- availability
  - -- required items such as protective glasses
  - -- enforcement

- Relief area: for breaks, lunch

J. Post Project

- Site cleanup

- Excess material removal

- Extended waste storage contingency

- Project review with coordinators

THE COLLECTION DAY

Sponsors should consider the following items for on-site waste handling operations during the collection day:

A. General Set-up

- Arrival of personnel
- Final instructions to personnel
- Restricted areas
- Media area
- Traffic flow -- provide directions to the site and on-site controls such as signs and cones.
- Opening time -- be prepared for early arrivals. Do not begin the event with a back-up of cars.

B. Entrance Area

- Well identified with markers such as signs and balloons
- Personnel -- police officer or other designated person should be present to control traffic as it enters the site.
- Waste pre-screening
- Distribution of literature/questionnaires/surveys
- Participant verification -- make sure only resident households and other targeted participants are admitted.

C. Receiving Area

- Traffic flow
- Personnel
  --responsibilities
  --qualifications

D. Sorting Area

- Identification of waste into hazard classification -- be sure to ask homeowners for information before they leave the site.

- Personnel
  - --authority
  - --responsibilities
  - --qualifications

E. Packaging Area

- Verification of waste classification
- Personnel
- Liability

F. Waste Loading Area

- Non-interference with traffic
- Close to packaging area

G. Vehicle Exit

- Coordinators
- Traffic Flow

H. Special Waste Area

- Haz-cat: identification of unknowns
- Paint consolidation
- Waste oil
- Designated site for especially dangerous waste such as dioxin, explosives, pentachlorophenol

I. Equipment Storage

- Accessible
- Non-obstructive

POST PROJECT

A. Finalization of recordkeeping

- Manifest
- Variances

B. Critique

  - by personnel
  - by sponsors

C. Identification of preventative measures

D. Determination of future plans

E. Notes of appreciation sent to

  - all personnel
  - all involved organizations

TRAINING FOR ONE-DAY AND PERMANENT HHW PROGRAMS

Bob Ceru
Chief, Special Programs, Ingham County Health Department
Lansing, Michigan

Proper training is an essential component of any successful HHW program, whether it is a one-day or permanent program. Although HHW is exempt from Occupational Safety and Health Act (OSHA) requirements, it is recommended that workers at HHW collections be provided with at least a 24 hour training course in hazardous materials handling, and one day of on-the-job training.

The program supervisor/manager should receive 40 hours of hazardous materials training (which includes training in OSHA regulations, industrial hygiene, toxicity, incompatibility, personal protection equipment, medical surveillance, air monitoring, respiratory protection, emergency response, etc.) This person should also have a strong background in hazardous materials handling and in chemistry. Trained personnel can be members of the program sponsors staff, fire department personnel, or a licensed hazardous waste contractor.

The following slides highlight some of the specific HHW collection jobs in a generic manner. They provide a broad overview of some specific training components. Training programs should be designed based on the specific jobs of HHW collection staff.

APPLICABLE LAWS

NFPA 472

Standard For Professional Competence Of Responders To Hazardous Materials Incidents, 1989

29 CFR 1910.1200

Hazard Communication Standard

29 CFR 1910.120

Hazardous Waste Operations And Emergency Response

SPECIFIC JOBS

- Publicity
- Education
- Traffic
- Materials Handling
  - Transporting
  - Sorting
  - Consolidation
  - Lab Packing
  - Treatment
  - I.D. Unknowns
  - Spill Response

1910.120 TRAINING FOR RCRA FACILITIES

WORKER	TRAINING
NEW	24 HOURS
CURRENT	PREVIOUS EXPERIENCE
EMERGENCY RESPONDER	AS NECESSARY

1910.120 REQUIREMENTS FOR SITE CLEANUPS

WORKER	TRAINING
GENERAL	40 HOURS OFF-SITE 3 DAYS ON-THE-JOB
OCCASIONAL	24 HOURS OFF-SITE 1 DAY ON-THE-JOB
LOW HAZARD	24 HOURS OFF-SITE 1 DAY ON-THE-JOB
SUPERVISORS	40 HOURS OFF-SITE 8 HOURS SPECIALIZE
EMERGENCY RESPONDER	NOT SPECIFIED

DECIDING ON THE BEST APPROACH

- FEDERAL LAWS
- STATE LAWS
- EMPLOYER
- SPECIFIC JOB
- AVAILABLE TRAINING
- CONTENT OF TRAINING
- SUPERVISION
- TYPE OF PROGRAM
- TYPE OF FACILITY

SUMMARY

40 HOUR TRAINING IS NOT A REQUIREMENT

THERE IS NO STANDARD TRAINING REQUIRED

TRAINING VARIES FROM STATE TO STATE AND PROGRAM TO PROGRAM

RECOMMENDATION:

MINIMUM 24 HOURS OFF-SITE

MINIMUM 1-3 DAYS ON-THE-JOB

An Overview of Used Oil Recycling Issues

Sarah Carney
U.S. Environmental Protection Agency
Office of Solid Waste

Household Hazardous Waste Conference
November 7, 1989

EPA believes it is important that household hazardous waste programs collect and recycle used oil generated by do-it-yourself (DIY) oil changers. Improper disposal of used oil by do-it-yourselfers is gaining prominence as an environmental issue for many reasons. First, it is a large and environmentally significant problem, many do-it-youselfers have no place to take their oil for recycling or do not know that it can be recycled and they simply put it in the trash or on the ground where it has the potential to cause damage to the soil, and surface and groundwaters. EPA is also putting more emphasis on the proper management of used oil as we renew our focus on source reduction and recycling issues as the center of our long-term strategy to deal with hazardous and solid waste.

EPA's program and strategy to assist the nation in solving the problem with municipal solid waste is outlined in our Agenda for Action. This explains EPA's activities and the roles of the many players in the solution to the solid waste problem. Used oil is one component of the waste stream where the amount recycled must be increased.

The purpose of my speech today is to briefly review the scope of the used oil problem, the regulatory history, EPA's program to encourage DIY recycling and the issues involved in DIY used oil collection programs.

The Problem

By EPA's estimates, 1,211 million gallons of used oil were generated in the United States in 1984. Seventeen percent, or 200 million gallons, of the total generated was generated by do-it-yourselfers. Most importantly, EPA estimates that only ten percent of all DIY oil is recycled. That means 180 million gallons per year are disposed of improperly - dumped down sewers, thrown into the trash, or buried in the backyard.

Some industry sources estimate DIY used oil generation as much greater that EPA's 200 million gallons per year. Some put it as high as 350 million gallons per year already. It is believed that the problem is growing every year. According to industry figures on projected oil sales over the next ten years, do-it-youselfers will be generating at least 230 million gallons by 1997.

The DIY used oil mismanagement problem is so large because DIYs do not know that the used oil can be recycled and even if they are aware of the need to properly handle the oil it is often very difficult to find a collection point that will accept DIY used oil. For this reason, it is very important that household hazardous waste collection programs collect used oil and recycle it. Of the many programs that do include used oil, used oil typically ranks second, along with pesticides, in the volume of material collected.

Used oil that is collected at household hazardous waste days should be separated from the other waste so that it can be recycled. This will assist the program by decreasing the amount of material that must be lab packed for management as a Subtitle C waste and therefore decrease the cost of the household hazardous waste collection program.

Regulatory History

In 1985, EPA issues a proposal to list used oil as a hazardous waste. We also finalized the rules for used oil that is burned for energy recovery - which is one of the most common recycling practices. In 1985, EPA also proposed management standards for used oil recycling.

In 1986, responding to the many comments against regulating used oil as a hazardous waste, EPA decided not to regulate used oil that was destined for recycling as a hazardous waste. The basis of EPA's decision was that the label of hazardous waste would create a stigma, thereby discouraging recycling and it environmentally beneficial effects. It was also decided that used oil destined for disposal would be regulated under Section 6 of TSCA or listed as a hazardous waste under RCRA.

Soon after, EPA was sued by the Hazardous Waste Treatment Council, the Association of Petroleum Rerefiners and the Natural Resource Defense Council on the decision not to list used oil. About a year ago, the Court decided that the statute does not permit EPA to consider the consequences in deciding whether to list. EPA is currently reexamining the listing issue. This does reintroduce some uncertainties, but it does not change EPA's position or the need to foster used oil recycling for the protection of human health and the environment.

The most important thing to emphasize is that the decision has no immediate effect on the current used oil management system. EPA continues to believe that voluntary, community-based programs are the key to effective DIY used oil management.

At this time, Congress is considering making changes in legislation governing used oil that may give EPA more flexibility on the listing issue. These changes could be in the reauthorization of

RCRA or in a separate bill. Several bills have been introduced into Congress.

EPA's Program

EPA has been supporting State and local used oil recycling programs by serving as a clearinghouse for information regarding used oil and by producing several documents. We currently have two issues of the "Used Oil Recycling Bulletins", a third is currently being developed. These bulletins are designed to share information and ideas about DIY used oil recycling. One bulletin contains, among other things, a list of contacts on used oil for every State, the other focuses on curbside collection programs for used oil.

EPA's has also very recently published this guide entitled "How to Set Up a Local Program to Recycle Used Oil". This "How to" manual is accompanied by three supporting brochures that are designed to assist the sponsoring group in educating the community. One of the brochures is for the general public, another for do-it-yourselfers, and the third is for service stations.

EPA hopes that these publications will assist State and local governments, interest groups, churches and other groups in setting up programs to collect DIY used oil for recycling. The "How to" manual details the many issues and options the sponsoring group can consider. I will briefly outline these issues.

Collection Programs

The type of State and local programs EPA supports are typified by Alabama's Project ROSE (Recycled Oil Saves Energy). As outlined in the "How To" manual, these programs can be run in many different ways and by many different sponsors. Some of the most successful programs are run as joint efforts between government and a local civic group. The goals of all recycling programs are the same, however the program is sponsored:

- To set up convenient system to collect and recycle DIY oil,
- To publicize the program effectively, and;
- To ensure that the collected used oil is properly recycled.

Many different types of collection can be successful in a local program. Used oil can be collected and separated for recycling at the curb with other recyclables or with regular trash pick-up. It can be collected at a permanent collection center with other recyclables, separately or at a household hazardous waste collection site. Used oil can also be collected with household hazardous waste or recyclables on specific collection days.

The key for programs that collect used oil is to make sure that used oil is never mixed with any other material. Oil that becomes contaminated with other types of wastes is likely to be rejected by recyclers, making it very difficult for programs to ensure safe management unless it is sent to a Subtitle C hazardous waste disposal facility. This defeats the purpose of collecting it for recycling and costs the program a lot of money.

Education and Publicity

Public outreach is an essential part of every program. The outreach program should answer several essential questions for the do-it-yourselfer:

o Why Recycle? - Because it protects human health and the environment and saves energy.

o How to Recycle Properly? - The key messages are, never dump, never mix used oil with other substances like paint thinners or gasoline and always use a reputable hauler and used oil recycler.

o When and Where to Recycle? - Once an individual is motivated to recycle the collection program must be convenient and well publicized.

EPA is committed to used oil recycling at the State and local level. Mismanagement of used oil is a significant problem that must be addressed through cooperation across government and private sectors. Voluntary efforts that collect used oil separately or along with household hazardous waste for recycling can have a significant impact on the mismanagement problem. DIY used oil is no longer an problem to be ignored. People are more aware of and willing to do something about environmental issues of all types. We must all work diligently to educate the public and provide collection programs so that the environmental and human health risks are reduced. Your experience, as experts in the proper management of household hazardous waste, could help greatly in solving this problem.

OIL RE-REFINING

George Booth, Executive Director, Association of Petroleum Re-refiners, Booth Oil Company, Buffalo, NY.

The "purist" definition of solid waste recycling is to reuse a material in its original form. Recycling in the used oil industry, however, can include burning for energy as well as oil reuse (re-refining). The re-refining process employs complex technical operations and processes to produce a contaminant free lubricant base oil. It also produces by-products.

Re-refining includes distillation processes that include dehydration, vacuum fuel/light oil stripping, and vacuum distillation. It also includes finishing processes that includes hydrotreating and fractionation. Hydrotreating is a relatively new process that involves final purification of the used oil by reacting the hydrogen with the halogens, sulfur oxygen and other remaining compounds.

In the 1950s, over one hundred re-refiners were producing over three hundred million gallons of oil per year. Today, only a handful of re-refiners are producing approximately 60 million gallons per year.

Suggestions for solutions to promoting used oil re-refining include:

o Developing a practical guide

o Providing public education

o Designing incentives to help make collection and disposal convenient, incentives for deposits, and providing protection from liability as an incentive to re-refining.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
CONFERENCE ON HOUSEHOLD HAZARDOUS WASTE MANAGEMENT

ORLANDO, FLORIDA
NOVEMBER 6-8, 1989

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TECHNICAL ASPECTS OF RECLAIMING USED OIL

Why Reclaim Used Oil for Fuel?

Used lubricating oils are collected from automobiles, trucks, buses, and locomotives and from industrial facilities. Although the lubricants used in internal combustion engines are contaminated with fuel, metal from engine wear, dust and water from the atmosphere, and acids, tars, and varnish resulting from heat, incomplete combustion, partial oxidation and the presence of sulfur in the fuel, they form an unusually uniform raw material for rerefining. Industrial lubricants are formulated from far more varied base stocks, thinner, (mineral seal oil), thicker (cylinder stock), napthenic, parrafinic, hydro treated and conventionally refined. These varied base stocks are blended with animal fats, vegetable oils, sulfur, sulfurized fats, chlorinated waxes, powdered and collodial graphite, molydemun disulfide, emulsifiers, demulsifiers, synthetic organics, in addition to the anti oxidents, detergents, viscosity index improvers and antiwear additives also used in formulating automotive lubricants. What this list tells us is that the additives in a compounded oil are often more valuable than the base stocks. When this lesson is applied to used industrial lubricants, two useful courses are apparent.

First, if the used oil is generated in sufficient quantity, and is not contaminated with too much other used oil, it is best recycled for reuse for its original purposes. (I use the term recycled, instead of rerefined or reclaimed because the treatment processes required to accomplish the recycling can vary from less than is required to reclaim used oil for fuel to as much as is required to rerefine used engine oil for reuse in engines.) When a substantial quantity of a single stream is not available or when the generator is unwilling to use a recycled lubricant, the second course is often advisable. The used oil can be reclaimed for use as a fuel. This second course is particularly advisable when the source of the used oil is, 1) the result of collecting small amounts of many different used oils in a large plant, 2) the skimmings of floating oil from a central sewer system in a large plant, 3) the wastewater treatment sludge from an industrial wastewater treatment plant, or 4) used oil collected used oil in small (drum) quantities from many small industries. However, before undertaking the reclaiming of fuel oil from used oil, it is extremely important to understand that some used oils, especially sulfurized and chlorinated cutting oils, should not be used for fuel oil because their burning will cause the emmision of HCl and SO2 to the atmosphere. These compounds contribute directly to acid rain.

Therefore, the fuel oil reclaimer processes used oil unfit for use in rerefining lubricants for reuse as lubricants. The fuel oil reclaimer also reclaims used oil unwanted as raw material for rerefined lubricating oil because of lack of capacity in the rerefining industry, lack of demand for rerefined lubricants or such that market considerations as distance, volume and price. In fact, almost 90% of used oil recycled is reclaimed for use as fuel.

How To Reclaim Fuel Oil From Used Oil

The reclamation process first requires the removal of the contaminants that would impede the use of the reclaimed material as a liquid fuel. The most obvious of these are solids and water. Solids tend to plug pipe lines, cause abrasive wear, and form ash in the heating device in which the fuel is burned. Solids are first removed in the collection process. Experienced collection drivers are careful not to pump from the very bottom of storage tanks, thus leaving substantial solids behind. Screen-type filters are normally installed before the truck pump, before the unloading transfer pump at the facility, and at other locations throughout the facility. Additional solids are removed with mechanically cleaned screens of finer mesh, such as vibrating screens, rotating screens, and brushed screens. Magnetic filters are also used to remove solids from metal working fluids. In some recycling facilities, centrifugal force is used to remove heavy solids from used oil. Facilities use different types of machines including basket, decanter and self-cleaning disc centrifuges. After the oil is completely water free, depth filters, such as filter presses, cartridge filters, or vacuum filters can be used to remove solids so fine that they are not removed by the means described above.

Some water, too, settles out as used oil is accumulated before processing. However, the old saying, "oil and water don't mix", certainly does not apply to dirty oil. If it did, those of us who make our living in oil reclamation would have gone out of business long ago. The amount of water that remains in used oil is a function of the viscosity and specific gravity of the used oil base stock, but depends even more on the presence of fats, detergents, and emulsifiers in the waste oil. In addition to gravity settling, water is removed from used oil by centrifugation, by heating the used oil/water mixture, by the addition of demulsifiers, and, when necessary, by evaporation or distillation. Experimental work in the past five years has demonstrated that the addition of small amounts of water to heavy fuel oils results in better atomization and more efficient combustion. This demonstration has led some burners to use crankcase oil directly as industrial fuel without removing the water retained by the additive package.

Many fuel oil recyclers end their processing with the removal of solids and water. The resulting fuel oil is usually sold as fuel for industrial furnaces or utility boilers. Use of this fuel oil in industrial furnaces minimizes the problem of the high ash content in this used oil fuel. Ash in used industrial oil results from somewhat different phenomena than those that cause high ash in used automotive oil. The major source of the ash that remains in used industrial oil after all solids have been removed is organo-metal reaction products resulting from the extremely high local temperatures and pressures that occur at the micro points of contact between the metalworking tool and the work piece. Additional ash is contributed by metallic additives used to blend industrial lubricants, especially gear oils, drawing compounds, cutting oils and forging compounds.

Ash in used automotive lubricants is derived from the additive package blended into modern engine oils and power transmission fluids. Other sources of ash in used engine oil are airborne dust that passes through the engine air filter, and is held in suspension by the additives, and engine material that finds its way into the motor oil as a result of corrosion during cold starts and engine wear, and fuel blow by, some of which still contains lead. As described above, a substantial portion of the ash in used oil cannot be removed by such conventional processes as settling, centrifugation or filtration. Methods, both proprietary and non-proprietary, are available to demetalize both used industrial and automotive oils. Some non-proprietary methods depend on treatment with one or more available inorganic chemicals, acid or basic. The purpose of these treatments is to render the metal bearing compounds insoluble in oil (acid) or soluble in water (basic), so that removal by settling, centrifugation or washing can be accomplished. Solvent extractions also yield excellent results in ash reduction. Most reclaimers of fuel oil, however, choose to deal with the ash problem not by treatment, but by dilution or by the sale of the reclaimed oil for use in industrial furnaces where the ash does not pose a problem.

Another method of ash reduction is by distillation of the bulk of the used oil overhead leaving the residue with the ash behind as a bottom product. Distillation also has other uses in oil reclamation. Moisture that is not removed from used oil by gravity or centrifugation because it is held in suspension by animal fats, coupling agents or detergent dispersants can be removed in a distillation process. Some fuel oil reclamation facilities use simple or fractional distillation to remove water, and often a light distillate cut, in a straight forward process. Other facilities recycle wet oil from a process tank through a heat exchanger removing the water by a combination of evaporation and settlement. Still others blow dry air through hot oil until sufficient water has been stripped to meet the required specifications. Distillation is also used to remove solvents and fuels from used oil. This process can be used to produce a range of fuel grades, remove low flash, chlorinated, or otherwise hazardous components and to improve fuel quality.

What To Do With The Waste Products Of Oil Reclamation

Once an oil reclaimer has processed his supply of used oil into finished products and containment waste streams, it is essential to proper recycling to determine the proper fate of both the products and, even more important, the wastes. The waste resulting from the reclamation of fuel from used oil vary with the raw material and the process. Careful collection of used crankcase oil and the subsequent sale of that oil untreated for blending with No. 6 fuel oil can result in no waste residues. When centrifuges and distillation, for example, are used to process used industrial oil into fuel, the waste products, water and solids consisting of both organic and inorganic material, can exceed the product in volume and pose major disposal problems. Water removed from used oils by gravity settling, centrifugation or distillation is rarely of a quality acceptable to local Public Operating Treatment Works and never of a quality that would allow its discharge to surface waters.

The best solution to wastewater treatment from oil reclamation is the construction of an on-site wastewater pretreatment plant capable of removing organics and solids from wastewater so that the output water meets the pretreatment requirements of the local POTW. API separators, pH adjustment, flocculation and air flotation are the usual unit processes required to pretreat wastewater from oil reclamation to pretreatment standards.

Solids removed from used oil by settling, screening, filtration or that are removed from wastewater during pretreatment present a challenge for the present and a greater challenge in the future for the operators of oil recycling plants. These solids contain various proportions of such inorganic materials as silica, metals and metal oxides, such organic fibrous solids as tobacco, cotton, wool, polyester, human hair, and paper. Both the granular inorganic and fibrous organic solids are bound together by the heavy, tarry products of partial oxidation of the used oil. Since used oil is not now regulated as a hazardous waste, solids extracted during the reclamation of used oil may be landfilled in either a Subtitle C, Hazardous Landfill, or, in many states, in a Subtitle D, Non-Hazardous Landfill. However, it does not require a crystal ball to see a landfill ban on by-products of used oil coming into effect within the next few years. When the after affects of the recent oil spill in Alaska are evaluated, some wise scientist may conclude that there is a substantial similarity between these crude oil residues and waste oil by-product solids, and recognize that many of the toxic constituents present in used oil become concentrated in the residues of reclamation. Progressive oil recycling facilities have considered this problem and have designed methods of dispersing the solids removed from oil treatment into supplemental fuels that can be burned successfully in cement kilns and other industrial furnaces as substitutes for coal. This approach provides a far more satisfactory solution, than landfilling from the point of view of environmental theory. The heavy, dry bottoms of some oil reclamation processes can be blended into paving asphalt.

A properly managed modern oil reclamation plant can process used oils, no matter how contaminated, into three "disappearing" streams; oil products burned into instinction in industrial furnaces, wastewater pretreated for discharge to the POTW which by virtue of the "domestic sewage exemption" is not a hazardous waste, and a supplemental fuel stream made from solid residues of the process which is burned in cement kilns with the inorganic ash becoming part of the cement.

Where To Burn Used Oil Fuel

In 1986, USEPA regulations and specifications for the burning of fuels made from used oils in residential, commercial, and institutional burners came into effect. EPA has promised and may, by the time this is published, have issued additional regulations governing the burning of used oil fuel in industrial furnaces and utility boilers. Fuel reclaimed for use in residential, commercial and institutional boilers should be low in ash and must meet the specifications listed below.

Constituent/Property	Allowable Level
Arsenic	5 ppm maximum
Cadmium	2 ppm maximum
Chromium	10 ppm maximum
Lead	100 ppm maximum
Flash Point	100 Degree F Maximum
Total Halogens	4,000 ppm maximum*

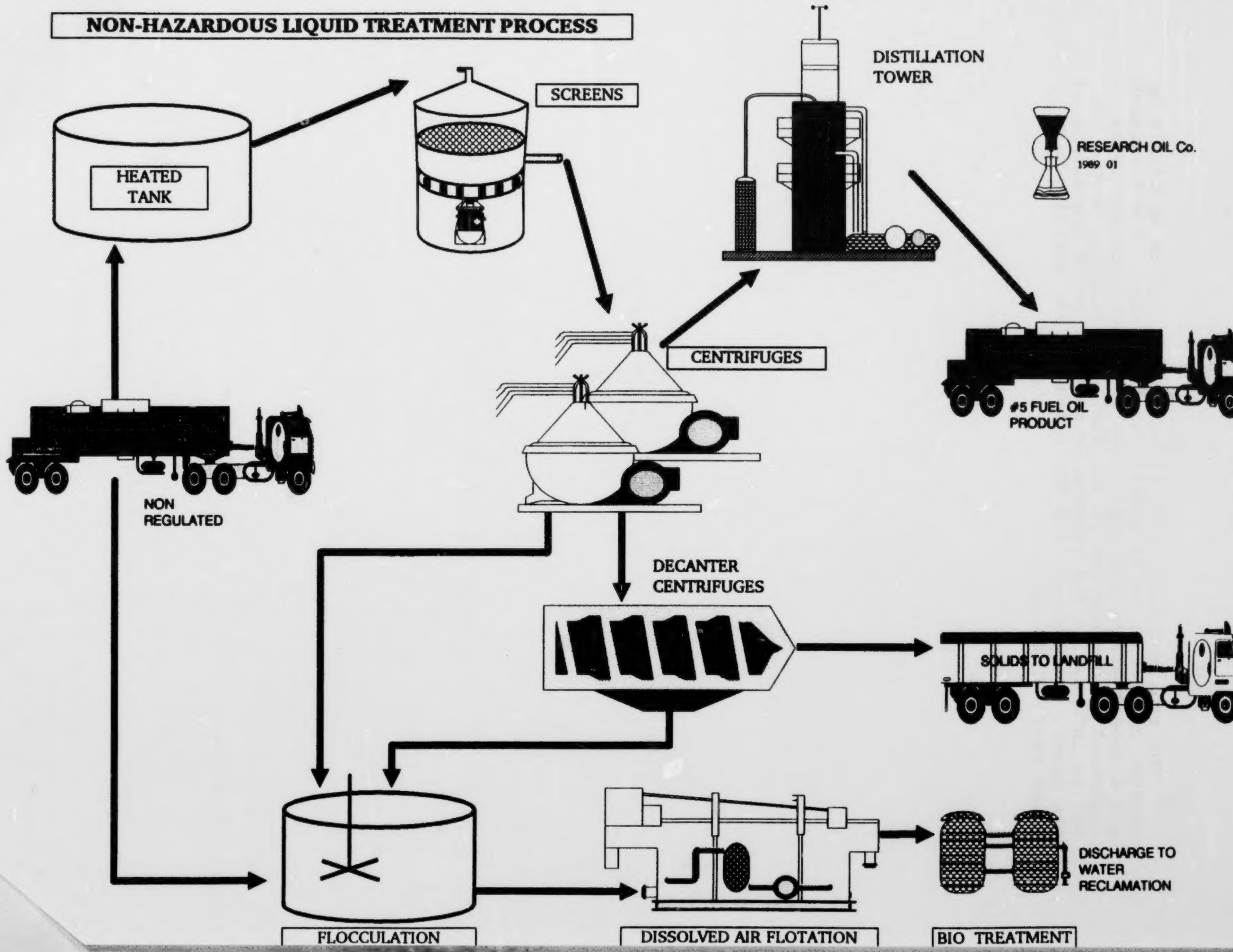
*Used oil containing more than 1,000 ppm total halogens is presumed to be a hazardous waste under the rebuttable presumption.

These specifications are often met through blending of the used oil either with a No. 2 fuel oil for use where distillate fuels are required or into No. 6 fuel oil to provide a lower sulfur, lower pour point, and lower viscosity residual fuel.

Used oil fuel destined for use in such industrial furnaces as asphalt dryers, blast furnaces, and line and cement kilns do not need to meet used oil specifications, but must not have been mixed with hazardous waste unless the furnace operator has complied with the regulations required for burners of hazardous waste derived fuels. Used oil fuels destined for burning in industrial furnaces are burned without blending, are blended into residual fuel oils, and are co-fired with solid fuels, coal and coke.

The reclamation of fuel from used oil can be as simple as careful collection or as complex as a refinery. The treatment and disposal of the waste products of oil reclamation is as important as the end use of the fuel. It behooves anyone who has an interest in the process to make a careful assessment of the plant, the process, and the output of any facility with which they do business.

FIGURE 9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DECANTER CENTRIFUGES
SOLIDS TO LANDFILL
FLOCCULATION
DISSOLVED AIR FLOTATION
BIO TREATMENT
DISCHARGE TO WATER RECLAMATION

USED OIL COLLECTION AND MANAGEMENT: An Update

by Carole Bell

Used oil means a petroleum based oil which, through use, storage or handling, has become unsuitable for its original purpose. In recent years, a substantial increase in the number of individuals who perform oil changes at home has been documented. More than 70% of the motor oil sold in the United States is purchased by individuals who change the vehicle oil themselves, yet most of these individuals are unaware of the dangers to the environment and public health from improper disposal of used motor oil. As a result, significant amounts of used oil are discarded in an unacceptable and often illegal manner into a trash receptacle, onto the ground or into sewers, storm drains, ponds or streams. Lacking a consistent regulatory framework, options for used oil recovery vary throughout the country. All, however, share a commitment to public education. Options for used motor oil recovery include: curbside collection, state, county, or community based drop-off programs, voluntary drop-off programs, retailer return programs, and household hazardous waste collections. Because of the expense of hazardous waste transport, storage and disposal, recovery of used motor oil through other programs is increasingly important.

ALABAMA: Alabama's Project Rose, created in 1977, is a state program sponsored by the University of Alabama and funded by the energy division of the Alabama Department of Economic and Community Affairs. Project Rose operates curbside collection programs in two cities: Birmingham and Tuscaloosa. Residents place sealed containers of used oil next to the trash on the regular collection day. Garbage collection vehicles have been fitted with metal racks to hold the oil containers. The oil is deposited in a city holding tank and sold at the current market price.

Project Rose also coordinates over 300 community-sponsored used oil drop-off centers. The community locates those gas stations and automotive service centers willing to participate as drop-off locations. Residents are responsible for informing the community about the availability of the recycling opportunity and the dangers of improper disposal. While Project Rose provides literature, press releases, public service announcements and two toll-free telephone lines, it is the community's responsibility to continue to educate and to keep the program functional.

Project Rose publishes an annual directory of used oil collectors and reprocessors in the southeastern United States, and provides information on changes in regulations and the oil market to the used oil collection, transportation and processing industries. Project Rose hopes to become an EPA sponsored clearinghouse for initiatives in local and regional used oil collection.

MICHIGAN: Michigan's used motor oil collection program is directed by the West Michigan Environmental Action Council, a non-profit citizens environmental advocacy organization. WMEAC is the coordinating body for a state-wide program of voluntary collection centers located primarily in service stations. WMEAC generates and distributes educational materials, operates a state-wide, toll-free 800 number, and recruits and coordinates the activities of a network of volunteers, both individuals and organizations.

Michigan's used motor oil collection program has been in operation for ten years. Over that time, economics has reduced the number of sites from 1200 to 700, with future prospects in question. The state's Cooperative Extension Network had provided local coordination in many areas, but has had to reduce its commitment. Fortunately, local governments have begun to take an interest in used motor oil collection and some Public Works Garages are serving as collection sites.

For the next three years, base funding for the WMEAC used motor oil collection program will come from Federal oil overcharge funds administered through the Department of Commerce. The program will receive $24,000 annually. WMEAC hopes to propose a package of legislation including an oil surcharge, a ban on dumping, and a requirement that retailers take back oil. Their long-term goal is to move away from the labor-intensive volunteer programs toward comprehensive management.

MINNESOTA: In March, 1989, the Minnesota Office of Waste Management initiated a program which makes Used Motor Oil Storage Tank Grants available to the state's eighty-seven counties. Each county may apply for up to $5,000 to purchase and install collection tanks, with a maximum of $2,500 per tank. The county retains ultimate ownership and liability for the operation of the tank, but may allow another entity to operate the facility. The county is also responsible for publicity.

There is no cost for disposal of used motor oil. Minnesota haulers do not charge to collect or transport used motor oil and 95% of the oil collected is burned for fuel in asphalt plants.

Currently, voluntary drop-off facilities at gas stations and county garages are found in the seven county Minneapolis-St. Paul metropolitan area, but few are available in rural parts of Minnesota. So far, nineteen counties have applied for grants to site thirty-eight storage tanks. These will greatly expand the used motor oil collection capability in the state.

RHODE ISLAND: Rhode Island state law requires collection and recycling of used oil to the maximum extent possible, by means which are economically feasible and environmentally sound. The stated goals are to conserve petroleum resources, preserve and enhance the quality of the environment and protect public health and welfare.

An estimated three million gallons of used industrial oil and over six million gallons of used motor vehicle oil are produced in Rhode Island annually (see Figure 1). Industrial waste oil consists primarily of lubricating fluids from industrial processes. Although often high in heavy metals, industrial waste oil is burned as a heating fuel and may be utilized in the manufacture of asphalt. Most industrial oil is recovered by industry.

Used oil from motor vehicles also contains lead and other heavy metals, but it is, for the most part, a recyclable resource with approximately the same heat value per pound as virgin oil. It is contained at the time of its removal from a vehicle, and requires only an accessible, environmentally sound collection system. Rhode Island Public Law, Section 23-19.6 (enacted 1980, revised 1985) defines and describes state policy on used oil recycling:

> Used oil is defined as a hazardous waste, subject to the Hazardous Waste Management Act of 1978, the Water Pollution Law, Chapter 12 of Title 46 and the Air Pollution Law, Chapter 23 of Title 23 and any subsequent regulations., Generators may choose to complete the hazardous waste manifest and follow the appropriate reporting procedures. As an alternative, the transporter may use the waste automotive oil manifest, leaving a receipt with the generator as proof of proper disposal. The manifest includes the name of the transporter, the date of the shipment, the quantity of the oil and its destination. Waste automotive oil logs are submitted to the Department of Environmental Management monthly and the records retained for a period of three years after delivery.

The Director of the Department of Environmental Management may designate collection facilities for the deposit of used oil at no cost to the person making the deposit. In 1980, service stations participated, voluntarily, in a used motor oil collection system. Signs designating the service station as a "Used Oil Collection Station" were posted and explanatory brochures distributed in retail outlets. The collection system failed as the economics of waste oil recycling deteriorated. When haulers began to charge as much as 50 cents per gallon to collect the used oil, gas stations withdrew from the collection system. By fall of 1986, only one facility, the state-owned and operated Central Landfill, accepted up to five gallons of used motor oil at no charge.

In November, 1988, the state of Rhode Island initiated a new program of collection and recycling of used motor oil that is safe and convenient. The program is a joint effort of the Department of Environmental Management and the local communities. The state provides to each community:

1) an on-site, user-friendly collection facility. The container, manufactured by Kotrac Recycling Inc., is an igloo, about five feet tall and five feet in diameter. Made of fiberglass, the igloo is self contained and holds 165 gallons of oil in steel reservoirs. A disposal funnel for the oil and a separate disposal chute for the bottles in which the oil is transported are protected by a locked, waterproof lid operated by a foot pedal. A built-in gauge allows monitoring of volume. When full, the container is emptied through a two inch coupling which can be locked when not in use. A door at the rear opens for removal of the empty bottles and jugs. The state of Rhode Island purchased forty (40) igloos at a cost of $1,800 each, delivered to a central storage area.

2) limited funding for site preparation and placement of the igloo. The state provides $700 per container; the actual cost, including a containment pad and enclosure on three sides, may run as high as $2,000.

3) removal of the oil by a contracted waste oil hauler. The current cost to the state for disposal service is 25 cents per gallon.

Each community participating in the used motor oil collection program is responsible for:

1) on-going maintenance to avoid a public health or environmental hazard including, but not limited to, repairs to the container, as needed; keeping the containment area neat and clean; and removal of any empty containers improperly discarded by the public.

2) site monitoring, including:
   a. limiting container deposits to five gallons per person
   b. prohibiting deposit of used oil from commercial sources
   c. notification of the proper state agency in the event of an oil spill
   d. prompt and effective spill containment and cleanup
   e. site security including supervision during working hours and locking of the container when supervision is not available
   f. compliance with any and all State and Federal regulations including manifesting all used oil pick-ups and maintenance of required records

3) notifying the contracted waste oil hauler when the igloo is full and

a. collecting a sample of the oil prior to its removal from the collection container by the waste oil hauler and exchanging this sample for one from the hauler's truck, prior to pumping of the collection container. If the container is the first stop on the hauler's route, then the community takes two samples from the container, giving one to the hauler and retaining one. The community must maintain the samples for a period of not less than six (6) months from the date of collection. Sample analysis may be requested by the State or the community. The community must submit samples to an approved laboratory and provide the State and the waste oil hauler with a certified carbon copy of the final laboratory report of such analysis. Cost of the analysis is borne by the community. The State will deem sample analysis necessary only in the event that there is reason to suspect contamination.

b. should a participating community's waste oil be found to be contaminated, the community is liable for the cost of proper disposal and cleanup of the oil, the collection container and the vehicles of transport. If a number of communities have contributed to the load of oil found to be contaminated and no one community is verified as the source of the contamination, all communities shall share equally in the cost of disposal and cleanup. Current cost for disposal of a contaminated load is 77 cents per gallon. The state pays the initial 25 cents per gallon; the community is responsible for the difference.

The initial start-up costs for this program were $200,000. $100,000 came from the Department of Environmental Management's OSCAR (Ocean State Cleanup and Recycling) Program. The other $100,000 came from Oil Overcharge Funds administered by the Governor's Office of Energy Assistance. Long-range funding will derive from the tax provisions of the Hard-to-Dispose-Of Law, beginning in January, 1990. This law imposes a tax of five cents ($0.05) per quart or five and 3/10 cents ($0.053) per liter on lubricating oils, collected upon sale from wholesaler to retailer.

There are currently twenty-two communities with igloos in place. Two of these communities have two igloos; five more communities are negotiating contracts. During the first quarter of collection, six communities recycled 3,000 gallons of oil. In the second quarter, during the winter months, fifteen communities recycled 7,000 gallons. The third quarter found eighteen communities generating 20,000 gallons of oil. By mid-August, nine months into the program, a total of 46,191 gallons had been collected. We anticipate a first year collection total in the area of 70,000 gallons.

Of course, there have been problems, particularly operational problems. For example, in one community, staff failed to line up the collection drums beneath the funnel. This caused the oil to pour directly into the igloo and required an extensive cleanup effort. In another instance, someone forgot to check the gauge which would indicate to them that the oil was, in fact, going into the collection drums and that the collection drums were full. In some communities, the staff did not empty the container bin so users left their empty containers on the ground. Some of these problems result from staff turn-over and failure to train new employees properly. In one community, water and snow accumulated in the containment pad because the community had failed to follow DEM guidelines. After the container was covered on three sides, the problem was eliminated.

During this first year of operation, there have been two incidents of contamination of the oil in community containers. In the first incident, the oil was contaminated by salt water. A possible explanation is that someone drained a boat bilge and poured the contaminated material into the igloo. Since this was a coastal community, another possible explanation is that the igloo was left open and wind driven rain contaminated the oil. The second incident was more serious, involving chlorinated solvents in igloos in two towns, ten miles apart. The oil may have been contaminated with solvents used to degrease engine parts, with CFCs/Freon from a refrigerator compressor motor or the oil may have been transported in a bleach bottle that was not quite empty.

In each of these incidents, the driver performed a dip strip test on the oil prior to emptying the igloo. When the test was positive, the driver left the oil in place. After laboratory analysis confirmed the contamination, the community arranged for separate disposal of the contaminated load.

We are particularly pleased that responsibility for this program is shared by the cities and towns. Eventually, each community will have an igloo in place and will be able to offer its residents an opportunity to dispose of motor oil in a convenient and environmentally safe manner. Increased public education about the used oil collection system and increased public awareness of the dangers of used oil disposed of improperly (remember, we had a 500,000 gallon oil spill in Narragansett Bay this summer) should serve to underscore the importance of Rhode Island's waste oil igloo collection system.

FIGURE 10

RHODE ISLAND ESTIMATED ANNUAL MOTOR OIL VOLUME

VEHICLE CLASS	CRANKCASE VOLUME	NUMBER OF VEHICLES	OIL CHANGES PER YEAR*	ESTIMATED ANNUAL OIL VOLUME IN GALS.
PASSENGER	1.25 gals.	621,176.00	4	33,105,880.00
COMMERCIAL	7.9	101,447.00	4	3,205,725.00
CAMPERS	1.25	5,545.00	2	13,862.00
MOTORCYCLES	0.75	30,325.00	1	22,744.00
SNOWMOBILES		472.00	see below	1,180.00
BOATS (outboard)		19,028.00	see below	71,355.00
BOATS (inboard)	1	6,177.00	1	6,177.00
TOTAL		784,170.00		6,426,923.00

The estimated annual oil volume totals are based on a formula of oil changes per year x crankcase volume x total number of vehicles per class. The number of oil changes per year represents the manufacturer's recommended maintenance schedule. Regular maintenance is assumed.

Education is THE KEY to Recycling Used Oil

presented by
Janet H. Graham, Project ROSE Coordinator
at the
4th National Household Hazardous Waste Management Conference
November 7, 1989

Used oil is a special waste stream - one with a tremendous recycling potential. It is a virtually untapped resource in our country with an energy value equivalent to virgin oil. Yet every day citizens or "Do-It-Yourself" (DIY) oil changers dispose of used oil in many ways that eliminate this recycling potential.

Project ROSE has developed a program that can be adopted by municipalities or states to initiate recycling programs to capture used motor oil. These recycling mechanisms have been developed, assessed, modified, and utilized during the past twelve years of Project ROSE service to Alabama. The presentation today will examine the education component of used oil recycling and discuss its importance in developing a sustained, viable recycling program.

Project ROSE (Recycled Oil Saves Energy) began in 1977 as an energy savings program for Alabama. Funded by the Alabama Department of Economic and Community Affairs - Science, Technology and Energy Division, Project ROSE is sponsored by the College of Engineering at The University of Alabama. The program's goals since its inception are to conserve energy, preserve the environment, and conserve a valuable, non-renewable natural resource - used oil. Project ROSE has developed many service functions that offer individuals and small businesses several beneficial services. These are:

- education programs to schools, service/civic groups, and community governments;
- collection center information and regulatory assistance to small business;
- collection assistance through the used oil waste information exchange;
- regulatory information provided to the used oil industry;
- input provided on federal regulations and congressional action; and
- networking with other recycling programs to develop comprehensive plans that can help communities achieve long-term recycling of used

motor oil.

There are three components of an effective used oil recycling program that addresses the DIY oil changer. These are 1) a used oil management network that can accept DIY used oil, 2) a market or markets for used oil, and 3) education and public awareness of the hazards of improper used oil disposal. The used oil management network and markets have been discussed by other members of today's panel. The markets for used oil are vital to the development of a used oil recycling program; however, education is the key to sustained recycling. Just as a key that unlocks a door, education is the tool that motivates the public and mobilizes communities in a voluntary used oil recycling program. Without education, a used oil recycling program cannot succeed.

Used oil is something we all generate - often in small, widely dispersed quantities that create a collection and recycling problem. The statistics of used oil generation echo this problem of recovery of DIY oils:

- over 1.2 billion gallons of used oil are generated annually;[1]
- DIYs and small businesses dump approximately 400 million gallons into the environment annually - the majority of the remaining 700 million gallons are recovered and recycled for marketing to industry;[2] and
- Coast Guard estimates report that sewage treatment plants discharge twice as much oil into coastal waters as do tanker accidents 15 million gallons per year as opposed to 7.5 million gallons from accidents with the major source of this pollution stemming from dumping of oil by DIYs in storm drains and sewers;[3] and
- only 14% of DIY used oil is recycled.[4]

Prior to the 1960's virtually all used oil was recycled because service stations routinely performed oil changes and collected this used oil for recycling.[5] The union of oil producing nations under OPEC raised the price of oil (thereby cost of an oil change) to a level that encouraged many automobile owners to change their own oil to lower their auto maintenance costs. This shift of oil changing activity from service stations to the individual auto owner went from 10% DIY activity prior to 1960 to over 60% DIY activity in the 1960s.[6]

Equally alarming is the volume of used oil that "fell out" of the used oil management loop as a result of the shift in oil changing practices. The Exxon Valdez dumped 11 million gallons of oil into Prince William Sound. Individuals and small businesses mismanage (mismanaged used oil is used in a variety of ways that eventually lead to land disposal or dumping!) or improperly dispose of about 400 million gallons of used oil each year - the equivalent of 35 Exxon Valdez spills![7]

Education has been and continues to be the key for bringing used DIY oils into the used oil management system (UOMS). Without a knowledge of the problem and incentives for participating in a used oil recycling program, DIYs will continue to haphazardly dispose of their used oil in environmentally harmful ways! What are some of the problems created by improper used oil disposal?

FIGURE 11.a

PROJECT ROSE™

recycled oil saves energy

FACT SHEET* 1988

Of all petroleum-related pollution in the United States, 62% is estimated to be used lube-oil, much of which eventually works its way to ocean.

Surveys done by DOE indicate that people who have heard about recycling programs, are three times as likely to dispose of used oil by taking it to a gas station or giving the oil away for recycling.

Do-It-Yourselfer's properly recycle only 14% of the waste oil they generate.

Of the 821 million gallons of motor oil sold in the United States in 1985, over 70% or 575 million gallons will be purchased by Do-It-Yourselfers.

Based on DOE figures, we can expect about 161 million gallons to be burned or leaked, with the balance of 414 million gallons to be drained.

Of the 414 million gallons only 58 million gallons will be recycled, leaving 356 million gallons to be disposed of.

Another 21% or 87 million gallons will be put in the trash or garbage, where if taken to a landfill, will end up in the nation's groundwater.

Another 25% or 103.5 million gallons will be used for miscellaneous purposes such as spreading on roads to restrict dust or to kill weeds, and may eventually end up contaminating the environment.

*Service Stations Dealers of America, Inc.

- used oil from one oil change can ruin over 1 million gallons of fresh water - enough for 50 families for one year;[8]
- one pint of used oil creates an acre slick on water;[9] and
- 1 ppm of used oil in water can be detected by taste and odor;
  35 ppm creates a visible oil slick; and
  50 ppm can foul a waste water treatment facility.[10]

Information to initiate Project ROSE was developed from a random survey conducted in Mobile and Tuscaloosa in 1977 by the League of Women Voters to identify the DIY population and disposal trends.[11] This information provided the framework for the development of appropriate educational programs for DIYs. Curbside programs were established. The success of these programs spread to other areas of the state. Networking through the twelve planning and development districts of the state, major metropolitan areas were targeted for establishment of voluntary collection programs utilizing existing used oil change facilities to voluntarily participate in the program as collection centers.[12]

Based on public education and awareness the program offers a safe, convenient method for handling a waste that poses a difficult disposal problem. Key factors utilized in program success are media to promote Project ROSE locally with low cost and high visibility, and community and/or civic leaders to embrace, promote and further the concept of DIY recycling.

Experience gained during the past 12 years has shown that programs with a strong, local support base; i.e. community leadership/sponsorship, have the greatest likelihood of developing and sustaining a long-term used oil recycling program. By giving the sponsorship role to local leaders, these leaders are able to unify civic organizations, promote used oil recycling, coordinate public education programs, and serve as a local reference point for used oil education and information.

Active participation at this local or "grass roots" level is a key element of the DIY collection program. By tapping this local resource programs can be tailored that reflect local needs or constraints, maximize community participation, and develop a program that becomes "the Community's" program. Thus Project ROSE acts as a facilitator in program development and design but the promotion and maintenance of the program reside in the community. Many Alabama communities have adopted this approach. Dedicated volunteers have accepted the lead role as Project ROSE promoters maintaining the visibility necessary to provide the continuity ensure program success.

Education is being geared to all levels of society in our state. Primary groups being targeted include driver education and automotive maintenance students, and primary and secondary education students. The driver education and auto maintenance students offer the greatest potential in altering the perception about the disposal of used motor oil and other automotive maintenance products (i.e. antifreeze, transmission fluid, brake fluids, etc.). By reaching these students at an this age, positive behavior changes can be effected to create life-long, conscientious consumers and recyclers of used oil. What is the focus of the education program?

FIGURE 11.b

PROJECT ROSE

FACT SHEET*

recycled oil saves energy

1986

.....Alabama generates 17 million gallons of used automotive oil annually; if this were recycled, it would generate the energy necessary to power 50,000 automobiles for one year; approximately 25% of this used oil is generated by do-it-yourself oil changers.

.....50 percent of all oil generated is lost through dumping, land spreading, incineration or road oiling.

.....Approximately six million gallons of used oil are dumped in our state each year; much of this dumped oil is attributed to do-it-yourself oil changers; this dumped oil, if reclaimed, could provide the equivalent energy to power 11,666 cars for one year.

.....One pint of oil can produce a slick approximately one acre in size.

.....Used oil constitutes the largest single source of oil pollution in our nation's streams and rivers. The largest source of this disposition is practiced by do-it-yourselfers. It is estimated that 85 million Americans change their motor oil.

.....2 1/2 quarts of lubricating oil obtained from refining one barrel (42 gallons) of crude oil could be obtained by re-refining ONE GALLON of used oil.

.....Because of the West Germans' subsidized program, 70 percent of all used oil is recovered. New Mercedez-Benz use re-refined oil.

.....Used oil is frequently a carrier of contaminants that are harmful to the environment and public health.

.....Crankcase oil drainings have been reported to account for more than 40 percent of the total oil pollution of our nation's harbors and waterways.

.....In Japan, the public is required to turn in their used oil in order to buy new.

.....One part of oil per million parts of water (1 ppm) can cause taste and odor problems in drinking water, 35 ppm can produce a visible oil slick on the water which can damage aquatic life, and 50 ppm can foul a waste water treatment process.

.....Recycling used oil could reduce petroleum imports by 25.5 million barrels of oil per year, saving 1.3 million barrels of oil per day.

1. Must make the issue(s) relevant - provide information that gets the DIY's attention.
    a. energy savings were a key "selling point" in the 1970's; however, the nationwide focus has shifted to environmental preservation with the decline in oil values and gasoline prices;
    b. environmental savings - the 80's trend is environmental preservation; and
    c. tell DIYs what the environment and human health hazards result from improper disposal of used motor oil.

2. Once you have their attention, explain the role of a conscientious DIYer.
    a. i.e., "Used oil never wears out - it only gets dirty". It can be reused as a fuel or re-refined motor oil.
    b. Explain the importance of proper recycling. Drain used oil into a clean container, seal it, do not mix it with anything else, and take it to a used oil collection center.
    c. Explain the importance of their role as an "environmental steward" - someone who takes charge. Project ROSE emphasizes that "one person can make a difference. By recycling used motor oil DIYs can successfully enhance an protect our environment for future generations!

What educational tools can you use? Several bibliographical entries are included as an appendix to this presentation. The Project ROSE "Fact Sheet" has generated the majority of attention for used oil recycling since the inception of Project ROSE. Brochures, PSAs (public service announcements aired by radio and TV), and press releases to local newspapers are invaluable promotional tools that can be developed and utilized by any program to organize local recycling programs. One key to remember: "Recycling used oil is EASY." Tap into your local network; utilize key community leadership; and involve business, government and individuals in a program that enhances the environment through community stewardship.

FIGURE 11.c

Table 1 Project ROSE Program Sponsors 1978-1979

	Anniston	Athens	Auburn	Birmingham	Camden	Decatur	Dothan	Gadsden	Grove Hill	Huntsville	Jacksonville	Livingston	Mobile	Montgomery	Muscle Shoals	Roanoke	Selma	Tuscaloosa
Project ROSE Program Centers	●	●	●	●			●	●		●	●		●	●	●		●	●
CIVIC / VOLUNTEER																		
Alabama Conservancy				■						■								■
American Legion																		■
Audubon Society				■									■					■
Beautification Council																		
Boy Scouts													■					■
Clean Community Commission		■								■								
Elks Club																		■
Friends of the Earth																		■
4-H																		■
Girl Scouts	■																	■
Jaycees / Jaycettes																		■
Landmark Foundation							■											
League of Women Voters								■					■					■
Lion's Club																		■
Local City / County Governments	■			■									■				■	■
Local Educators / Students																		■
Local Recycling Center											■							
Neighborhood Improvement													■					
PIONEERS (South Central Bell)				■														
PRIDE Program											■							
Sierra Club				■														■
Senior Citizens																		■
OTHERS																		
Council of Local Governments															■			
Cooperative Extension Service					■									■		■		
County Agents									■									
County Commissions						■						■					■	
Forestry Commissions														■				
Local Oil Reprocessors			■					■					■					
Rural Development Commission														■				
State Planning Commission																		■

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3. U.S. EPA, How to Set Up a Local Program to Recycle Used Oil, EPA/530-SW-89-039A, p. 1.

4. Gottlieb and Brinkman, Analysis of Potential Used Oil Recovery from Individuals, Market Facts under U.S. DOE Contract No. DE-AC19-79BC10053, July 1981, p. 42.

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Impact of FIFRA '88 on Household Hazardous Waste

Tracy Bone, Chair of the Household Pesticide Waste Committee, EPA, Washington, D. C.

The Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) regulates pesticides. The 1988 amendments made to this act expands the scope of pesticide regulation in many ways. The most important issues for household hazardous waste are found in Section 19, "Storage, Disposal, Transportation, and Recall."

The Pesticide Management and Disposal Staff is now drafting regulations for section 19. The following is what is being proposed to satisfy the mandates outlined in section 19 of FIFRA.

The safe storage of pesticides will be assured by a set of performance and design standards for pesticide storage facilities. A set of standards for pesticide containers is also being written. These containers will have to meet performance standards for safe use, residue removal, and stability for the container and the formulation. There will also be requirements as to the durability and recyclability of the materials used to make the containers depending on whether the container is a one-way or a two-way (container is reused) container.

On the label of the pesticide the registrant of that pesticide (every pesticide is registered with the EPA before it can be marketed) must list disposal methods for excess pesticide, rinsate from the container and disposal of the container itself. Data from the disposal methods chosen by the registrant will be required so that the EPA can judge the soundness of the methods chosen.

The above regulations are proposed and it is not certain which will make it to the regulation or to which pesticide products they will apply. Agricultural and industrial pesticides will produce the most excess pesticide to be disposed of simply because they account for the most used as counted by weight so they should recieve more attention than household pesticides. Household pesticides account for approximately only 6% of the pesticide used yearly in the United States (EPA, 1987) but, they a majority of the containers, more than 124 million each year as opposed to 90 million agricultural containers (EPA, 1984). Household pesticides may or may not be included in the above regulations.

The regulatory options being looked at specifically for household pesticides are label changes and container design standards. Some of the following phrases could be added to the label: Use completely, Do not contaminate food or water, Check with your sanitation department for information on a local hazardous materials collection. The containers could be required to be "cleanable" and a method for rinsing or cleaning described on the label or the materials used for the container could be made of recyclable materials.

Again, these are options being proposed, the proposed rule should be published in the Federal Register June 1990 and the final rule should be published December 1991. Even though the exact nature of this rule is uncertain, at a minimum it should reduce the number of containers going into the municipal waste stream and that the containers which do go into the municipal waste stream should be cleaner.

"Pesticide Industry Sales and Usage, 1987 Market Estimates", 1988, E. P. A., Office of Pesticide Programs.

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Summary
State Agricultural Pesticide Collection Programs
by
Dr. Charles P. Cubbage
Michigan Department of Agriculture
November 6-8, 1989

California

In late September and early October of 1989, an Ag Chemical Collection program was held for one day each in Kings and Tulare counties, sponsored and supported by a wide variety of interests including the chemical and waste management industries, environmental and citizen's groups, Cooperative Extension Service, the California Agricultural Commission, U.S. EPA, the counties' Farm Bureaus, and various units of government. Costs were set at $3.00 - $3.50/gallon. Limits on the quantity accepted were set by transportation regulations at 1,000 pounds.

Florida (1,2,3,8, & 13)

The Amnesty Days Program conducted from May 1984 to May 1987 collected over 1.5 million pounds of hazardous waste from over 12,000 participants, including 369 farms. After the state program ended, a number of counties continued with their own funding. No fees were charged and a 450 pound limit imposed.

In 1988 the Florida Legislature reauthorized Amnesty Days for 1989. Phase I of the reauthorized program resulted in nearly three times the participation rate compared to the initial input from the same counties, collecting 1.1 million pounds from 11,000 participants in just one year. Farm input represented just under 1% (99 participants). Among the 91,000 pounds collected the materials included pesticides, lawn chemicals, herbicides, and some lab chemicals. Again, no fees were charged and the weight limit was reduced to 100 pounds/person. Unfortunately, the summary document reviewed did not detail farm input from the other possible sources in the category, and time did not allow further follow-up.

Hawaii (11)

Although it is not a continuing program, Hawaii Department of Agriculture conducted a collection for homeowners and farmers in 1986 and 1987. In 1989 a homeowners only program was conducted. During a two-week period in 1987, approximately 8,400 pounds of pesticides were collected at 6 sites and collection fees amounted to $14,550. DDT and chlordane were the most represented products with some of the materials as old as 50 years.

Illinois (3)

Illinois has recently enacted HB 1398, an amendment to the Illinois Pesticide Act, and only awaits the Governor's signature before the Department of Agriculture in cooperation with the Illinois Environmental Protection Agency will develop a model program for the disposal of unwanted farm pesticides. Funding will come from two State Treasury sources, already established by the Environmental Protection Act, the Hazardous Waste Fund, and the Hazardous Waste Research Fund that set $12.12/cubic yard or $0.06/gallon fees on disposal of hazardous wastes in 1989 with increases in 1990.

The legislation specifies that local units of government and nonprofit organizations shall be the operational units for the program's activities. The program shall not include pesticides from dealers nor retailers. Furthermore, the program will not be subject to the rulemaking requirements of the Illinois Administrative Procedures Act. The grants will be limited to $25,000 and will require 50% match. Program results will be reviewed by the state in 1991 at which time an interagency committee will make recommendations for a statewide program.

Maine (3,4, & 5)

The Board of Pesticides Control in Maine began its activities in waste pesticide management in 1972 with efforts initiated by the Audubon Society. Over the next 7 years, the staff collected unwanted materials on an unpublicized basis, making arrangements to pick up materials, door-to-door, as people called in with requests. Funding levels remained relatively low with $26,000 in 1982 and $35,000 in 1984. Supplemental funding ($30,000) was sought in 1984 to carry the program to 1986. The program report identifies the inefficiencies of the door-to-door collection mode with respect to use of staff time and mileage (4,5).

In 1988, the Maine Legislature passed a bill providing $100,000 in emergency funds to the Board of Pesticides Control, Department of Agriculture, Food and Rural Resources for the collection and disposal of household, agricultural, and commercial wastes that have been banned by federal law. A spring collection netted 22 tons including materials collected from 186 farms. As with the Michigan program, arsenic and chlorinated compounds were well represented with some having originated in the 1940's. A spring 1990 program may be forthcoming. A report on the program is presently being drafted.

Michigan

In November 1988, the Michigan Toxic Substance Control Commission established a pilot farm pesticide collection project as part of a larger state-wide program to fund pesticide collection from households. The program encouraged participation in the State's Clean Michigan Fund activities by supplementing those communities that had household hazardous waste collection projects. The farm portion of the project involved cooperative planning with the Michigan Department of Natural Resources, Cooperative Extension Service, the Michigan Department of Agriculture, and the private sector.

The single day collection netted 21,000 pounds of pesticides from 63 farms. The median age of the products was 20.4 years. Lead arsenate was the most common material with DDT and a host of other pesticides following in diminishing quantities. At the invitation of U.S. EPA, MDA has submitted an application grant for an expanded farm collection program for 1990. There is state-wide support for MDA budget appropriation for 1991 to make the program permanent. Grant support from the Wege Foundation and the Toxic Substance Control Commission amounted to $40,000 with materials disposed of by incineration and hazardous waste landfilling at an average disposal cost of $1.90/pound.

Minnesota (12 & 14)

Minnesota has conducted a number of farm pesticide collection programs. A $200,000 two year legislatively funded program was initiated in 1987. The program utilized a variety of approaches ranging from free to several levels of participant fee structures with collections between April and August 1988 and on May 20, 1989. The results of the 1988 phase was presented at the 1988 Household Hazardous Waste Conference and was more fully described in the proceedings of that conference. However, the highlights include survey input that identified 41,605 gallons and 61,059 pounds of pesticides reported by 475 respondents as needing collection. The collections that followed netted over 8,500 pounds and 2,400+ gallons of pesticides with ages ranging from current to over 40 years old. Out of the program, seven recommendations were developed and are outlined in the project report.

As a result of one of those recommendations, the Minnesota Department of Agriculture has implemented a program that focuses on public education and recycling efforts aimed at pesticide containers. As with the Mississippi program, research has been directed at detection of pesticide residues in recycled products, mainly drainage tile. The farm education component includes a review of rinsing equipment available and on its efficiency. The MDA is involved in demonstration of the equipment as part of its educational efforts.

The other six recommendations include: (1) identifying the need for U.S. EPA to develop policy or rules exempting farmers and other designated participants from complying with generator requirements under RCRA for participation in state-sponsored waste pesticide collection programs, (2) state involvement in more comprehensive public and farm education programs specific to the use and management of pesticides to minimize waste, (3) state and federal evaluation of the actions which create waste through cancellation or use restriction, (4) the evaluation of in-state disposal options, (5) establishment of collection and disposal activities, and (6) permanent funding sources for these pesticide programs.

Mississippi (10 & 13)

As of January 1, 1989, a special program has been instituted in Mississippi to recycle plastic pesticide containers from farm and aerial applications. Over 20,000 containers from a single county were collected at eight sites from nine aerial applicators. Containers involving 48 pesticide products were triple rinsed and recycled into agricultural drainage tiles. The project involved testing at various points to assure that any residual pesticide materials would not create a problem. Results indicate that proper rinsing will provide raw materials suitable for a wide variety of non-food applications, e.g., the drainage tile.

North Carolina (3)

The North Carolina Department of Agriculture, Food and Drug Protection Division, has a continuing Pesticide Disposal Public Assistance Program that was implemented in 1980. The program summary information indicates that since 1980 nearly 260,000 pounds of pesticides have been collected with 130,000 pounds in 1987 alone. Both 1988 and 1989 resulted in the approximately 30,000 pounds. In 1983 and 1984 quantities were exported and offset the expenditures. Disposal options included incineration, chemical detoxification, and landfilling with costs since 1985 ranging from $2.64 - $5.11 per pound.

Washington (6,7)

In 1986, the Washington State Legislature passed SSB 5026 providing for a study to describe and assess the problems associated agricultural chemicals - "farmers have no appropriate economically feasible means of legally disposing of small amounts of ... pesticides with uses cancelled or restricted after purchase." An initial survey indicated that nearly 42 tons of waste pesticides were on Washington farms and that the estimate was undoubtedly low.

As a result of the study, in 1988 three county cooperative collections were held at which approximately 25 tons of pesticides were collected at no cost to participants. The 1989 program has one collection completed and second to be completed by November. The results of the first collection involved 36 participants and produced approximately eight-nine tons at no cost to participants. Over 80 different products were collected with DDT and lead arsenate as the main components. It was obvious that some of the products were in the 20-30 year old range (7).

This summary is intended to provide a national overview of current state activities. The author is indebted to those who supplied the information and the author accepts responsibility for any errors in the data presented. It would be appreciated if additions and corrections would be brought to the attention of:

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It is the intention of the author to maintain a database of nationwide state activities that may be accessed by any interested parties.

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WASTE MANAGEMENT - OVERVIEW

JUDY ORTTUNG
SAN BERNARDINO COUNTY
DEPARTMENT OF ENVIRONMENTAL HEALTH SERVICES

It is assumed that once these wastes are collected, that those which are hazardous will be managed as hazardous waste; i.e. in full compliance with all state and federal regulations for hazardous waste, despite the current exemptions for these wastes. It is important that program managers be aware of changing hazardous waste requirements and also be aware of changing technologies. This is a rapidly changing field, both with regard to requirements and technology, thus keeping up to the date requires considerable effort. There are a number of journals and periodicals dealing with hazardous waste management and the regulatory framework which are helpful. Additionally there are a number of organizations for hazardous waste generators. In Southern California there is a Household Hazardous Waste Information Exchange which has been meeting for the past year. Attendance at meetings includes representatives of the state agencies involved as well as representatives of local agencies currently sponsoring HHW programs. We have found that these programs have similar problems and it helps to talk to someone who has already dealt with this or is also looking for a solution.

Who will manage the waste? In planning a program, answering the question who will manage the waste is a key decision. A few agencies use in-house staff to at least initially manage the waste. These programs use in-house staff to perform the initial sorting and screening of the waste, as well as to bulk and/or lab pack the waste. Many programs, instead, have hired a contractor to perform these tasks. As with most things, there are pros and cons for each option. The major advantage for an agency to directly manage the waste is that it allows full control over all aspects of waste management. Storage, treatment or recycling options, and when necessary selection of a final disposal method. Along with full control, however, comes additional responsibility. This option requires more staff with diverse backgrounds and capability. It also requires adequate storage areas. By contracting for these services, fewer staff are needed at the agency. However, it is essential that there be someone knowledgeable about this issue to review and evaluate the contractor's work. The level of control retained is dependent on the specific terms of the contract.

Regardless of which option is selected for initial screening, sorting and packaging, eventually the waste will have to be sent to a recycler or, a treatment or disposal facility. Generally this is done on a contract basis after soliciting bids from qualified contractors. Thus at some point an "RFB" or "RFP" ("Request for Bids"/"Request for Proposals") must be developed. Elsewhere on the conference program there is a workshop devoted to this subject. I will only take the time in this workshop to point out the importance of developing the "RFB" carefully since the final contract will be based on the points raised in the request. It will save both your time and the potential contractor's if all details are carefully spelled out, both the services desired and the qualifications necessary. Typical services may include lab-packing, identification of unknowns, transportation of wastes, consolidation, preferred recycling and/or treatment options. Typical qualifications may include necessary state and local permits, a specific level of insurance, an affirmative action program. It is important to work with your agency's attorney as well as your purchasing department in order to determine the qualifications and contracting requirements which should be listed. Additionally, it may be helpful to contact similar HHW programs and request a copy of their most recent RFP.

The actual waste management options available to a program ar for the most part dependent on the volume of each waste type, local recycling opportunities and availability of treatment capacity. It is important to emphasize that there is no single option which will be appropriate for all wastes. Each waste is unique. Different options are appropriate depending on the physical-chemical characteristics of the waste. For example, incineration is inappropriate for inorganic wastes containing lead or mercury. However, depending on the specific characteristics of the waste, metals recovery may be the best option available. Within our program in San Bernardino County, we make every effort to apply the same hierarchy to our waste management practice that we recommend to hazardous waste generators. That is if possible we arrange to recycle the waste. If that is not possible we then seek appropriate treatment methods. As a last resort we will seek disposal in a hazardous waste landfill.

We are fortunate in that the largest volume wastes coming into our Collection Center, used oil and paints and thinners, are recyclable. Generally it is the unusual wastes which are the most difficult to manage. Often it takes some ingenuity to find an outlet for the waste. For example, recently we received a significant amount of calcium carbide, a chemical used to generate acetylene gas for a welding torch. We were able to find an acetylene supplier who was willing to accept the carbide for use in their commercial process.

Permanent collection centers offer a considerable advantage over one day events with regard to waste management opportunities because they offer the luxury of time since the waste may be stored while alternative options are pursued.

IMPOSING LAND DISPOSAL RESTRICTIONS ON HOUSEHOLD HAZARDOUS WASTES

by Leigh Starlin

I would like to speak to you about certain regulatory issues you may want to consider as you propose legislation and design regulations for household hazardous wastes. In particular, I will address the land disposal restriction requirements from a household hazardous waste perspective.

EPA identified household wastes in the May 19, 1980 RCRA regulations as a solid waste which is not a hazardous waste. This exclusion was based on language in a Senate report which stated:

> (The hazardous waste program) is not to be used to control the disposal of substances used in households or to extend control over municipal wastes based on the presence of such substances." (Senate Report No. 94-988, 94th Congress 2nd Session, at 16.).

Most of us have come to recognize that proper waste management is the responsibility of individuals and communities as much as it is industries. This becomes more and more clear as we see municipal landfills named to the Superfund National Priorities List. This concern has led to voluntary household hazardous waste collection days and mandated programs in some states to address the issues of proper management of household hazardous wastes.

Some states are considering taking it a step further by using their prerogative to form regulations more strict that USEPA's and regulating household hazardous wastes as a hazardous waste, i.e., removing the exemption. While the goal of these states is laudable, the implications of completely removing the exemption bears examination.

With the passage of the Hazardous and Solid Waste Amendments (HSWA) in 1984, the regulation of hazardous wastes has become more far reaching and complex. In particular, the land disposal restrictions have tightened control on the management of hazardous wastes, providing a strict regulatory structure for the country's and EPA's goal to move away from land disposal and towards recycling, resource recovery, destruction, and immobilization as preferred waste management techniques.

The land disposal restrictions establish treatment standards for each hazardous waste, either by prescribing one or more specific treatment technologies or by requiring that wastes by treated to meet certain concentration limits. As individual states gain authority to enforce the land disposal restrictions, household hazardous wastes not afforded the exemption would be subject to stringent requirements in a number of areas. I will address three: analysis, recordkeeping, and locating a treatment, storage, or disposal facility.

Analysis

Each hazardous waste must be assigned applicable waste codes . There are hundreds of waste codes, based on waste characteristics, processes generating the waste, and chemical products that have been discarded. Treatment standards for the land disposal restrictions identify a number of constituents that may be restricted for a given waste, based on the applicable waste codes. Two sets of analysis are typical for a waste, one to identify whether the waste is hazardous and another to determine whether applicable treatment standards have been met. The analytical protocols for establishing whether a waste has been adequately treated are exacting and expensive. A single waste stream I recently worked with needed testing to determine if it could meet treatment standards. I received an estimate of about $7,000 for the lab work necessary to demonstrate that treatment was adequate. The cost for determining this for every possible "hazardous" waste stream generated by households would be very high.

Recordkeeping

Records must be kept on every restricted waste stream, notifying management facilities must be notified of applicable restrictions. Considerable data is needed to complete the notifications. Certifications must be prepared and signed stating under penalty of law that the waste has been managed in accordance with the restrictions. Records including copies of notices, certifications, demonstrations, waste analysis data and other documents must be retained for a minimum of 5 years. This would create a huge volume of paperwork for municipalities to create and maintain.

Locating a Treatment/Disposal Facility

One affect of the implementation of the land ban that is being seen is a reluctance by many facilities to take on certain wastes. This stems primarily from the "derived from" rule. This rule causes hazardous waste codes to carry through from the original waste to any treatment residue generated. Currently, household hazardous wastes that have been collected may be readily accepted by treatment, storage or disposal facilities and appropriately managed along with other similar hazardous wastes. No identification by hazardous waste codes is required. Therefore, there is no carry through of a hazardous waste code. By incorporating hazardous waste codes from the RCRA rules, appropriate waste codes would have to be assigned to each hazardous municipal waste component. This would probably hinder acceptance of household wastes at treatment or disposal facilities.

Hazardous waste treatment, storage, and disposal facilities may be limited to certain hazardous waste codes in their permit. Other waste codes can prove to be political hot potatoes due to the perceived danger to public health and the environment. Once you have made household hazardous waste subject to all the requirements of a hazardous waste, you may have a lot more trouble finding an outlet for that quart of wood preservative that someone found when they were cleaning out their garage. That small amount of waste with a particular waste code could disproportionate costs for analysis and residue disposal to the treatment or disposal facility because of the carry-through of the code.

The commercial hazardous waste management industry and other industries that generate and manage hazardous wastes incur tremendous costs in complying with hazardous waste management rules. For them it is a cost of doing business and is handled in an economy of scale. Industries tend to be familiar with the characteristics and components of the waste streams they generate. Programs and systems of management have been developed over the last decade to comply with all the standards required for operations, management, construction, training personnel, and permitting. To subject household wastes to these same requirements would tremendously increase the economic burden on municipalities and counties.

Many states and communities are having a great deal of success in household hazardous waste collection and management that is administered through solid waste management programs. By encouraging voluntary cooperation by citizens in household hazardous waste days, recycling, and "paint exchanges" (where unwanted products in usable condition are made available to theatre groups, schools, and churches), household hazardous wastes can be managed effectively and in a manner protective of the environment. I suggest that we look to states with these types of programs that encourage voluntary compliance with hazardous waste management rules as a model on which to build legislation, regulations and programs to address environmentally sound management of household hazardous waste. This is a much more manageable and effective approach than mandating that household hazardous wastes take on the entire scope of RCRA Subtitle C hazardous waste regulations.

PROBLEM AND PRIORITY HOUSEHOLD HAZARDOUS WASTES

Elizabeth M. McCormick[1]

HHWM IV Conference
Holiday Inn, International Drive
Orlando, Florida
November 6-8, 1989

"Priority" and "problem" wastes may vary in different settings. One collection program sponsor may be concerned with which wastes present the greatest risks to households, site workers, or the environment, while others may want to handle all possible materials and be concerned when some wastes are more expensive or difficult to manage than others. Still other sponsors must determine how to make the best use of limited resources, and may choose to conduct collection programs which focus on limited waste types. In any case, factors in determining what wastes are problems or priorities include risk (hazard), volume, cost, and technical or regulatory concerns such as availability of disposal capacity.

Common problem wastes include explosives, unknowns, radioactives, biologicals and dioxins. Collection programs commonly exclude explosive or shock sensitive materials. This is partly due to the difficulty or high cost of having an explosives technician and bomb magazine on site throughout a collection, but there is actually a sound safety reason for emphasizing this exclusion in all advertising. Do sponsors really want the average resident throwing an explosive in the trunk of a passenger car, bumping down the road, and waiting in a traffic line in the hot sun? Instead, residents who believe they have explosive or shock sensitive waste should be encouraged to call public safety officials, and have the material evaluated in its current setting. Sponsors should also make arrangements to have local EOD or bomb squad personnel on call during a collection in case unexpected materials are received.

Unidentified wastes are problems due to the unknown risks to site workers, the high cost of laboratory analysis, and regulatory constraints on transporting and disposing of unidentified materials. Unknowns should not be confused with unlabelled wastes. It is very common for residents to place wastes such as used motor oil, paint thinners, and mixed pesticides into milk jugs and other containers. It is very uncommon for the resident to then label that container. If participants are allowed to simply drop off wastes and leave the site, unlabelled wastes become true unknowns, and true problems. Instead, if waste is quickly reviewed with the participant present, unlabelled wastes can be marked and the incidence of true unknowns goes to much less than 1% of incoming materials.

Few radioactive materials other than smoke detectors are encountered in HHW collections. Although these are exempt from most radioactivity regulations, disposal capacity is limited and often expensive. Residents are generally encouraged to return the smoke detector to the manufacturer or place of purchase.

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[1] GSX Chemical Services, Inc., P.O. Box 210799, Columbia, South Carolina 29212, 800-845-1019 or (803) 798-2993.

With increased emphasis on home health care, there is an increasing possibility of "biological" wastes such as used needles, syringes, bandages, and dialysis or -ostomy fluids. Most patients and caregivers receive instruction from their physicians, but limited quantities of these materials and veterinary products have been received at HHW collection programs. Site workers tend to be (understandably) reluctant to handle these wastes. Sponsors should discuss these materials in advance with local health departments, and try to make arrangements for red bags and disposal through local hospitals or clinics. These materials may also be acceptable at municipal incinerators.

Dioxin remains one of the most troubling problem wastes. Dioxins are associated with two types of consumer products - herbicides which contain 2,4,5-T and related compounds, and wood preservatives which contain pentachlorophenol (PCP) and related compounds. Although dioxins are little if any more "hazardous" than many other materials handled at HHW collections, there is virtually no permitted disposal capacity in the United States at this time. Some dioxin associated materials are exported for incineration in Canada, but this avenue is limited by strict controls on transborder waste shipments. There are indications that one or more incinerators in the United States may be able to accept dioxins in the next year. Until adequate disposal capacity becomes available, collection program sponsors are usually faced with unpleasant choices. Residents may be told to take their dioxins home and store them until a collection when disposal is available. Imagine the impact on the average resident when told that he or she has a waste so bad that a hazardous waste contractor won't take it! There is a high probability that the dioxin will be promptly discarded in the trash or nearest dumpster. Alternatively, the sponsor may accept the material and send it to the limited and expensive commercial storage facilities available - for an unspecified period until disposal is available. In some cases, sponsors may store the materials themselves - if secure space is available and local regulatory conditions allow. For now, the only comfort is that routine disposal of these materials appears to be closer than was the case during previous conferences.

On the brighter side, there are many success stories on priority wastes. There are two common methods for prioritizing wastes. One is to look at the highest volume materials. These undoubtedly include used motor oil, lead-acid batteries, and paint. These three materials routinely make up 20-50% of all wastes received at collections, and some programs have reported that paint alone was 60% of the total. Fortunately, these are also some of the least expensive waste to handle. At this time, lead-acid batteries are actually bought from large volume collectors for $0.25-1.00 each.[2] Collection programs sponsors are unlikely to be paid for batteries, but are also unlikely to be charged for disposal if local recyclers agree to handle the batteries. Bulk used motor oil disposal may cost from $0.10-0.35 per gallon[3], or much more if contaminated by hazardous materials, but local recyclers frequently agree to accept used oil at no charge to collection program sponsors. Useable paints may be donated to low income or elderly housing, theater groups, used to paint municipal buildings, or reprocessed. Latex paint may be dried and handled as a solid waste in some but not all states. Oil based paints or paints with heavy metal pigments should generally be handled as hazardous wastes. There have been several successful, low budget collections for these three types of waste alone. Such programs could also fit well with other community programs such as the Keep America Beautiful recycling campaigns.

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[2] **Source: The Markets Page, Recycling Times, October 24, 1989.**

[3] **Ibid.**

The other common approach to prioritizing waste is to review relative risk or hazard. This may be difficult. What may seem to present a low risk to the community may present a large perceived hazard to the individual resident. Sponsors who plan a focused collection program should always be aware that participants will bring additional wastes in the hope that they will be accepted. After motor oil, batteries, and paint, pesticides are one of the largest volume wastes received at collections. In fact, in rural or agricultural areas, pesticides may be the largest single category of waste. Pesticide only or farmer only programs have been successful in several areas and may be a reasonable alternative for a sponsor who can't collect everything.

Each potential collection program sponsor must determine the right type of program for their own community. Whether a sponsor chooses to handle or exclude problem wastes, or to hold a focused collection for priority wastes, there has probably been a similar successful program held in the past few years. With so many models to choose from, there should be no reason why a community cannot hold program which meets their individual needs.

CHARACTERIZATION OF HHW/ STANDARDIZATION OF DATA MANAGEMENT

Judy Orttung
San Bernardino County
Department of Environmental Health Services

Background: Since household hazardous waste (HHW) generally does not fit into existing EPA waste categories, there is, at present, no standard classification system for it. Consequently various programs report volumes and types of waste received by a variety of terms and a variety of units. Some programs refer to generic categories of products: paints, oil, adhesives, cleaners, etc. Other programs use D.O.T. hazard categories to describe their waste: corrosive, flammable solid, flammable liquid, poison, etc. Similarly, various programs report their wastes as pounds, gallons, number of containers, drums, etc. As a result it is difficult to compare data provided by different programs. Early this year an informal HHW Information Exchange was formed in Southern California to address a variety of issues relating to HHW. One of the issues raised is the characterization of HHW and the standardization of data management. A small sub-committee has been meeting for several months to address this issue.

Reasons to collect data: The subcommittee began by trying to identify the reasons for seeking standardization and data collection since that would determine the kind of data needed and its format. The sub-committee identified and agreed upon the following reasons to collect this data:

- To identify the scope and nature of the problem;
- To provide estimates for long term expansion;
- To determine treatment and/or recycling capacity needs and opportunities; and
- To provide a database/clearinghouse of waste management programs.

It is interesting to note that two reasons which were not originally identified may ultimately drive this effort. These are (1)the potential need to report wastes collected to the newly created California Integrated Waste Management Board in order to obtain reimbursement from the state for collection programs and (2)the potential need to report waste collected to the State Department of Health Services as a permit condition.

Kinds of information needed: In order to provide necessary information to meet the needs identified the subcommittee decided the following data categories would be most useful.

- Total volume of HHW collected
- Individual waste streams collected (including volume of each)
- Number of participants/population served
- History of collection events in area
- Costs for handling treatment/disposal by waste stream
- Overall program costs

Formats considered: In reviewing program summaries and data from various programs throughout California, two specific categorization schemes emerged: a generic **product** list and a generic D.O.T. **hazard category** listing. Ideally if we are collecting this data to determine treatment and/or recycling capacity needs and opportunities, the generic product data would be most useful for spotting changing trends. Additionally the generic product listings are particularly useful for wastes which are recycled and not manifested. Not all programs currently collect this data. On the other hand, most programs currently do have data available based on the D.O.T. generic hazard categories since that is how the waste is manifested. Similarly, there is a wide divergence in the units used by various programs.

Proposed format: The sub-committee proposed a flexible report form which allows for reporting either the generic product listing or the generic hazard category or both. Additionally, the proposed format allows for reporting solids by weight, liquids by volume and some wastes (aerosol cans and batteries) by number of containers received. It has been proposed that a standard conversion factor be agreed upon for each specific waste category to allow an estimate of the number of drums of each waste be determined based on the pounds or gallons of waste reported and vice versa. Some programs utilize more specific hazard categories, for example organic peroxides, and have requested that these categories be expanded. At this stage the proposed form is still in draft stage and the sub-committee is seeking comments and suggestions as to additional listings and possible conversion factors. The draft reporting form is provided for your comments. Please send your comments to: Judy Orttung, San Bernardino County DEHS, 385 N. Arrowhead Avenue, San Bernardino, CA. 92415.

FIGURE 12

DRAFT REPORT FORM FOR COLLECTING HHW DATA (1)

Waste Category	Gallons or	Pounds	Number of or Containers	Conversion Factor (2)	Number of Drums (55 gal) (3)	Mngmt Method (4)
A. Flammable					______	______
1. Used oil	______				______	______
2. Paints						
a. Latex	______				______	______
b. Oil base	______				______	______
c. Oil base with solvents					______	______
thinners & stains	______				______	______
d. Non-recyclable	______				______	______
				sub-total	______	
3. Solvents, thinners, stains	______				______	______
4. Putty, adhesives, asphalt-type coatings	______				______	______
5. Gasoline and oil (mixed)	______				______	______
6. Aerosols/compressed gas containers (excluding pesticides/herbicides)			______		______	______
7. Other	______				______	______
		______			______	______
			______		______	______
				sub-total	______	
				Flammable sub-total	______	
B. Poisons					______	______
1. Pesticides or herbicides (including aerosols)						
a. non-dioxin cntng	______				______	______
		______			______	______
			______		______	______
				sub-total	______	
b. Dioxin-cntng	______				______	______
		______			______	______
			______		______	______
				sub-total	______	
2. Other (not including mercury)	______				______	
		______			______	
				Poisons sub-total	______	
C. Corrosives					______	______
1. Acids						
a. Oxidizing	______				______	______
b. Non-oxidizing	______				______	______
				sub-total	______	
2. Alkaline	______				______	______
		______			______	______
				sub-total	______	

Waste Category	Gallons	or Pounds	or Number of Containers	Conversion Factor (2)	Number of Drums (55 gal) (3)	Mngmt Method (4)
D. Oxidizers (excluding acids)	______				______	______
		______			______	______
				sub-total	______	
E. Miscellaneous						
1. Car Batteries			______		______	______
2. Dry Cells		______			______	______
3. Mercury (excl. batteries)		______			______	______
4. Other	______				______	______
		______			______	______
			______		______	______
				sub-total	______	
			Total wastes collected		______	

(1) This form may be used to report either by product category or by hazard category

(2) Yet to be determined, will be specific for each type of waste

(3) This may be changed to allow for 30 gallon or 55 gallon drums

(4) Management Methods
- Ru Re-used
- Rc Recycled
- Bf Blended fuel
- Tr Transfer station
- T-1 Incinerator
- T-2 Aqueous Treatment
- T-3 Stabilization
- D Land disposal

PAINT MANAGEMENT OPTIONS

by

Linda Giannelli Pratt
San Diego County Department of Health Services
Hazardous Materials Management Division

Communities throughout the nation are experiencing a heightened level of awareness of what constitutes a household hazardous material. Attached to this awareness is usually a sense of responsibility to seek out appropriate methods to dispose of the waste. Household hazardous materials collection programs have had a tremendous increase in the level of public participation within the last two years, and as a result, the programs are now faced with a hazardous waste management crisis that could rival most businesses. The waste stream that constitutes the largest volume collected is paint and related products.

The biggest worries about paint used to be whether or not one chose the best color, and how to avoid making a big mess in the gutter while cleaning out the brushes. Those worries have been replaced by laboratory analysis results, and massive levels of environmental regulations. Left-over paints contain ethylene, hydrocarbons, petroleum distillates, resins, glycol, ethers, esters, mercury compounds, and traces of lead and chromium. Nationally, oil-based (solvent) paints are considered a hazardous waste, and latex (water-based) paints are being more closely scrutinized by environmental regulatory agencies. Methods to manage the paint collected through household hazardous materials programs vary between states as well as between regions within the same state.

A telephone survey was conducted which asked basic questions about paint management options, including the volume of paint collected, analysis of the waste stream, disposal costs of paint, recycling opportunities, and source reduction techniques currently being used. The survey was administered to representatives from Florida, Vermont, Michigan, Idaho, Washington, and California. The results of the survey revealed, not surprisingly, that because most of the programs are relatively new, comprehensive data management systems have not yet been developed. Therefore, only general comparisons can be made between the various programs.

VOLUME OF PAINT COLLECTED

Typically, the paint waste stream consists of oil-based and latex paints, various stains and varnishes, and aerosol spray cans of paint. The average volume of paint collected obviously depends upon the opportunities provided to the public to dispose of the unwanted material. It was interesting that latex paint was not even accepted by some programs because it is considered non-hazardous, accepted by other programs which also consider it non-hazardous, and has been classified as a hazardous waste by other states. For those programs that accept latex as well as other paints, this waste stream constitutes more than 60 percent of the material collected.

California offers a wonderful example of the inconsistency of handling latex paint. The state has not formally declared latex paint to be hazardous, but laboratory analyses have shown that levels of mercury exceed hazardous waste limits, and there have been traces of PCB's found in some samples. The full range of options for handling latex paint varies between neighboring regions. That is, some counties do not accept latex paint, while others accept it and treat it as non-hazardous, and others take a more cautious approach by handling it as a hazardous waste.

COST FOR DISPOSAL

Many programs have not yet developed recycling or reuse programs for the paint waste stream, and are disposing of all of the material. Predominately, the oil-based paint is not recycleable because of the volatile organic content (VOC) which exceeds new air pollution control standards. Therefore, the paint is incinerated at an average cost of $10-$12 per gallon. The latex paint is either disposed of at a municipal landfill at a very low cost, or disposed of at a Class I landfill or incinerated as a hazardous waste at virtually the same cost as the oil-based paint.

The most troubling component of the paint waste stream is aerosol spray cans. These must be lab-packed, meaning that an average of 20 cans are included inside each 55-gallon drum. Some of these are landfilled at a Class I and others are incinerated. The cost for disposal ranges between $3-$40 per can!

RECYCLING OPPORTUNITIES

The recycling efforts of various programs throughout the nation are to be commended! There are many interesting success stories of reusing paint. The key to successfully recycling the material is providing a quality product, and finding an appropriate market for that product. Most often, government-sponsored collection programs prefer to donate the paint to non-profits or charitable organizations. In 1987, San Diego county was able to sell the 55-gallon drums of paint to the public at a County Cooperative Auction, but at an average cost of $20 per drum, a decision was made to focus efforts donating the paint to worthwhile causes.

A preliminary step necessary to produce a "quality" product is adequate segregation of the paint. The first step is to segregate the oil-based and latex paints, and then to further separate by light or dark color. Typically, this results in a beautiful light beige color and a complimentary dark beige color. Some programs prefer to contract with a paint manufacturing company to consolidate and package the recycled paint. Other programs do their own consolidation, usually into 55-gallon drums. Relatively new cans of paint that are nearly full, and the label is easily read are selected for "material exchange tables" or "swap tables". These are reused directly, without being consolidated into the drums.

Who wants someone else's old paint? High school and college drama classes, graffiti eradication projects, low-income home improvement projects, social service agencies, and prisons, just to name a few! When looking at the cost benefit for recycling material the two factors that must be considered are the cost to dispose of the waste, and the product cost savings to the user.

RESTRICTIONS LIMITING THE RECYCLING OF PAINT

Oil-based paints can not be reused in certain air pollution control districts because of more stringent VOC requirements. There is not a uniform standard on the acceptable level of VOC in paint. In California, the Air Resources Board has identified solvents in paint as a contributor to air pollution, and has set limits of 250 g/liter of VOC for architectural coatings. Some latex paint samples have exceeded that limit! Other states have followed California's lead in reducing the VOC limit for paint. If the paint can not be recycled, then it must be landfilled or incinerated, and the cost of doing so is threatening the economic survival of household hazardous materials programs throughout the nation.

A second restriction that impedes the ability of a program to consolidate and recycle the paint collected is that any form of "treatment" may require the issuance of a Treatment, Storage and Disposal Facility (TSDF) Permit. Treatment is defined as any change in the physical make-up of the material, and as such, filtering the paint prior to consolidating it may be viewed as treatment.

SOURCE REDUCTION OPPORTUNITIES

Prudent purchasing is the key message for many of the community education campaigns. BUY ONLY WHAT YOU NEED AND THEN USE IT UP! This remains the best source reduction effort for paint, as well as most other waste streams encountered by collection programs.If the choice is between oil-based and latex paint, recommend latex. Discourage the use of aerosol spray cans when possible.

Many program representatives would agree that source reduction opportunities could be greatly assisted by appropriate legislation that would do the following:

- Develop packaging requirements that would reduce the volume of material sold so that there was more of a likelihood that the material could be used up.

- Create a product user tax on hazardous materials sold in order to help defray the cost of household hazardous materials programs, and to draw attention to the issue of safer substitutes.

- Improve product labeling requirements so that it clearly states appropriate disposal options.

The dynamic issue of household hazardous materials is evolving into one of the most important hazardous waste management topics of the 1990's. It is not so much because of the volume of the waste generated by homes, although that volume could pose significant harm to refuse collectors and landfills. Rather, it is because of the attitude change that is occurring. Hazardous waste is not just "somebody else's " problem, but rather, it is the responsibility of everyone to help resolve.

LATEX PAINT RECYCLING

Christine Luboff, Curt Bailey, and Philip Morley

INTRODUCTION:

All public agencies involved in programs for collecting household hazardous waste know that paint, and particularly latex paint, is the highest volume waste. In Seattle, for instance, we have a permanent collection facility which has been operating since October, 1988. Between January and August of this year, we collected a total of 533 barrels of wastes. Nearly half of this, 47%, is latex paint.

In Seattle we have made a policy decision to handle all the wastes we collect as hazardous wastes for purposes of disposal. We have taken this conservative stance as the most protective of the environment. We feel that until we have data to indicate that a waste need NOT be considered a hazardous waste, it is our responsibility to handle it as such. The greatest concern is for metals, particularly lead – from old lead-based paint, and mercury from fungicides.

As a public agency, we are faced with a challenge of accountability. On one hand we are accountable to local residents for setting an example of assertive environmental protection. On the other hand, we are accountable to the rate payers. Ton for ton, household hazardous waste (HHW) is a very expensive portion of the solid waste stream to manage. Those of us responsible for developing HHW programs must be financially accountable to our management, to our elected officials, and to the citizens, for designing programs that protect the environment in as cost-effective a manner as possible.

The Solid Waste Utility is also committed to complying with the state mandated waste management hierarchy: Waste Reduction; Recycling; Treatment; Stabilization; Disposal.

The project was designed to look for a better way of managing latex paint. Latex volumes are high, current disposal practice is costly, yet data on potential hazard are incomplete. Landfilling is the least preferred management strategy. We wanted to reduce costs, document hazard (or lack of hazard), and climb up the waste management hierarchy.

MOTHER OF PAINT:

The latex paint project has taken place in two stages, which we have called "mother of paint" and "son of paint". In both cases the work has been performed by Philip Morley, of Morley and Associates, and by representatives from local paint manufacturers, in particular Curt Bailey of the Puget Sound Paint and Coatings Association.

The goals of mother of paint were:

- to see whether discarded latex could be reprocessed into a recycled paint which met acceptable industry standards;
- to evaluate the recycled paint in the field;
- to review regulatory and liability issues;
- to analyze the economics of latex paint recycling;
- to perform laboratory analyses of discarded latex and to determine whether it met hazardous waste criteria;
- to evaluate the feasibility and economics of disposal as a municipal solid waste.

COLLECTING, SORTING, AND REPROCESSING:

For mother of paint we collected 2700 containers (quart, 1 gallon, and 5 gallon) of latex paint brought to a one day collection event. This paint was sorted into recyclable and non-recyclable portions according to criteria designed to enhance the paint's marketability, technical performance, and safety.

The recyclable portion (300 gallons) was tested for the presence of selected metals and organic volatiles to ensure compliance with labelling and product safety laws. The results of these tests showed that hazardous constituents were within acceptable limits. It was also evaluated according to standard paint industry laboratory tests such as viscosity, dry time, odor, sag, scrub resistance, and opacity. Industry analysts classified the paint as a flat, interior painter's grade latex, and determined that reprocessing needs were minimal. Finally the paint was mixed, filtered, and packed into 5-gallon plastic buckets. The recycled paint was medium beige, very similar to the color found in many government offices!

FIELD EVALUATION:

The recycled product was field tested at five commercial, industrial, and residential locations to confirm the quality of the product determined by the industry tests. The paint was donated to organizations willing to participate in the test. After application, the painters responded to an applicator's survey designed to evaluate their satisfaction with the paint. In response to questions concerning the paint's coverage, bubbling, dripping, odor, and drying time, applicators were generally pleased with the product quality. Two users identified a stronger odor, which dissipated on drying.

Three months after application, site evaluations were conducted to evaluate how well the paint was holding up on the wall. Uniformity, sheen, and tendency to show marks were evaluated. Again, the paint was found to be performing well.

REGULATORY AND LIABILITY ISSUES:

If paint recycling is going to feasible as a full scale program, we have to ensure that the product meets requirements for labeling, and for preparation of a Material Safety Data Sheet (MSDS).

A review of relevant federal regulations, and discussions with the U.S. Consumer Product Safety Commission's Compliance Officer determined that an adequate label could be designed for latex paint. Our original concern was the extent to which we would have to account for all possible contaminants in a post consumer product. The guidance we received was that exhaustive testing is not necessary, and that hazards should be identified based on knowledge of hazardous constituents generally known to be used in latex manufacture. The label contains a standard "Caution" statement, and a protective "no warranty" statement.

Again, with the MSDS, the concern was whether we would have to try and identify all possible contaminants. State and federal "right to know", or hazard communication, regulations permit the manufacturer to limit disclosure to "ingredients of which they are aware", at least as far as physical hazard is concerned. The regulations regarding procedures for identifying health hazards in mixtures are spelled out separately, and we are still awaiting final interpretation of the regulations to see whether each batch of paint should be tested separately, or whether analysis of representative batches is sufficient.

The MSDS that we have developed to date includes information from MSDS's from new latex paints, and information from the laboratory analyses described below.

LABORATORY ANALYSIS:

After the discarded paint was sorted and bulked, we had two separate batches: a recyclable batch, and a "rejected" or non-recyclable batch. Samples of both were solidified with a four to one mix of hydrated lime and alum, and were sent for laboratory analysis. Latex is typically solidified prior to landfilling.

The question we wanted to answer was would either of these batches be considered hazardous waste. If the paint does not show hazardous waste characteristics, then it is a candidate for disposal as a municipal solid waste at a significant savings. We felt it was good liability protection for the City to analyze and document the content of the paint waste, rather than make an assumption about its non-hazardous nature. This gives us some protection from future Superfund liability.

The tests we performed in this first phase, "mother of paint" were EP toxicity metals, total metals, and semi-volatile organics analysis. The reject batch was thought to represent a "worst case scenario", as it contained all paint rejected from reprocessing, including those likely to have higher mercury and lead content. As it turned out, the recycled batch contained higher levels of both lead and mercury, suggesting that we needed a more efficient sorting procedure, in particular to remove lead-based paint, which is frequently brought in to Household Hazardous Waste collection.

All the metals tested well below EP toxicity limits in both batches. The semi-volatiles organics analysis showed measurable levels of phthalates, naphthalene, methylnaphthalene, and benzyl alcohol. Seven other TICs (Tentatively Identified Compounds) were also present.

In addition to listed wastes and characteristic wastes, Washington state regulations also define criteria wastes. There are criteria for toxicity, persistence, and carcinogenicity. A waste is a toxic hazardous waste if the equivalent concentration of toxic constituents exceeds .001%. The equivalent concentration was calculated, and was well below .001% for both paint batches. The samples also showed negative as persistent or carcinogenic dangerous wastes.

The conclusion from these tests is that solidified latex from mother of paint need not be disposed of as a hazardous waste. The non-recyclable portion was solidified and landfilled as a municipal solid waste.

ECONOMICS:

We evaluated the economic benefits of three possible alternative latex paint management scenarios and compared them with our current practice of hazardous waste disposal.

1. **Dispose all discarded latex as municipal solid waste.**

For bulked paint, disposal costs are calculated to be $6.90/gallon if disposed of as hazardous waste, and $4.90/gallon if disposed of as municipal solid waste. In Seattle this is a net savings of $2.00/gallon. (This savings will be different in each jurisdiction, depending on local labor and transportation costs, tipping fees, and so on.)

In 1990 we project that we will collect over 12,000 gallons of latex in Seattle alone. The cost of disposing of it all as hazardous waste would be $82,800. The cost of disposing of it all as municipal solid waste would be $58,800. The savings in Seattle, in this first year, would be $24,000. The savings in the whole of King County is projected to be $52,000.

2. **Recycle a portion and dispose of the remainder as hazardous waste.**

In our pilot project, 45% of the discarded paint was recyclable. The cost of recycling includes sorting bulking, reprocessing, testing, and packing. These costs amount to $4.20/gallon. We also projected marketing costs and revenues from the sale of the paint. These projections are estimated to result in a net gain of $2.10/gallon. The overall cost of recycling is thus $2.10/gallon.

45% of Seattle's projected 12,000 gallons in 1990 is 5,400 gallons. The cost of recycling them would be $11,340. The cost of hazardous waste landfilling the rest would be $45,540. This adds up to a total of $56,880; $2,000 cheaper that disposing of it all as municipal solid waste, and $26,000 less than disposing of it all as a hazardous waste.

3. **Recycle a portion and dispose of the remainder as municipal solid waste.**

As before, the cost of recycling is $2.10/gallon, and the cost of disposal as municipal solid waste is $4.90/gallon. The total cost of 1990's 12,000 gallons would be $43,680, a savings of $39,000 over disposal as a hazardous waste, and $15,000 over disposal as a municipal solid waste.

Each of these options is more cost-effective than our current disposal practice. Recycling some of the paint is clearly economically advantageous, as well as being a preferred management strategy. Recycling combined with hazardous waste disposal costs approximately the same as disposing of all of the paint as municipal solid waste.

As disposal costs increase, and as the quantities of paint collected increases, we can expect even more significant savings from implementation of an on-going recycling program. Based on current projections, a program to recycle latex, and dispose of the rest as municipal solid waste would yield, over the next 20 years, a cost savings of $2.5 million in Seattle, and $8 million in the whole county!

SON OF PAINT:

We were very encouraged by the success of mother of paint, and decided to follow up with a larger scale demonstration. This project is currently in progress. The goals of "Son" are:

- to collect, and sort 5000 gallons of discarded latex;
- to repeat the reprocessing and industry testing to confirm the quality of the recycled product;
- to perform further laboratory analyses to reconfirm disposal status;
- to test-market the recycled paint.

This time we collected the paint from three collection day sites, and from our permanent collection shed. This gave us a chance to test our sorting protocol with four groups of specially trained sorters (see Appendix 1). This time we were more careful to sort out potentially lead-containing paint. We also wanted to test the effectiveness of the training and the sorting instructions, and see whether the sorted batches of paint produced a product of consistent quality.

The four different sortings produced four slightly different colored batches. This time some titanium dioxide, a white pigment, was added to each of the batches to produce a consistently colored end product. We also decided to add some lemon scent to mask any stronger-than-normal smell. The chemical assays and industry tests again showed that the recycled paint was a product of acceptable quality.

For this second phase, we decided to do additional laboratory tests to more thoroughly identify any possible contamination in discarded latex. In addition to EP toxicity, total metals, and semi-volatile organics, we are analyzing for volatile organics (VOA) and total halogenated hydrocarbons. The goals are to confirm the designation of this material as a non hazardous waste, and to identify any hazardous constituents in the recycled paint, to ensure complete disclosure on the MSDS. This time, therefore, we are testing both liquid and solidified samples. No results are available yet.

Another family of potential contaminants that we are interested in is fungicides and bactericides. These pesticides are additives in paints, especially in the damp Northwest. We researched a list of 28 pesticides that may be present in latex paint. Some of these chemicals are the source of mercury contamination.

MARKETING:

We are about to embark on an effort to market the recycled paint. Five paint manufacturers with retail outlets in the Puget Sound region will participate in this marketing project. Brochures and other sales materials will support the marketing program.

As we have only a limited amount of paint (3000 gallons), and a limited amount of time, it is important that we 'make a big splash' so that we can gauge the interest of potential buyers, and encourage the continued interest of paint manufacturers. Ultimately, this project will only be successful if there is a market for the paint.

We propose to sell "Community Pride" - the name of our recycled paint - at \$5.00/gallon. This price was arrived at after surveying the price of new low-end painter's quality flat latex (the paint that corresponds in quality to the recycled latex). At \$5.00/gallon, "Community Pride" would undercut the price of its competition by about \$1.00/gallon.

The potential market was reviewed in "mother of paint" by mailing letters and a brochure to 31 architects and construction professionals who prepare paint specifications. A follow up phone survey showed that professionals would be willing to specify or use recycled paint, provided that the quality and specifications were documented, and that the price undercut new paint. \$5.00/gallon was considered a good price.

Informal response from the professionals surveyed, and from members of the public who have heard about our program show that there is enthusiasm about the idea of being able to buy recycled latex. Some of our most interested potential customers are people who bring paint residues in to collection facilities. Seattleites have developed a good deal of community pride in our very successful solid waste recycling program, and they seem eager to be able to participate in another "environmentally-sound" innovation. So we are hopeful that our marketing test will be as successful as the other aspects of this project.

PAINT INDUSTRY PERSPECTIVE:

The National Paint and Coatings Association originally took the position of discouraging the recycling of paint products. This was because of the difficulty and expense of transporting and tracking the many different products back through the distribution system.

They are now reconsidering their position, given the data we have developed for consolidating the handling and reprocessing of flat latex paint from a given region. The paint industry is beginning to recognize the fact that "paint" is the largest factor involved in the collection of household hazardous wastes.

There are a number of association members, lead by regional manufacturers, who support the recycling of waste paint. We believe that eventually even the national producers of paint will recognize their responsibility in dealing with the large volumes of excess or waste paint that is stored in homes and businesses.

CONCLUSION:

The paint recycling project shows much promise. The cost savings potential is significant, and recycling is a preferred strategy for managing the paint waste. To date five batches of discarded paint have been reprocessed, and a consistent quality material has been produced.

It is worth pointing out that "Community Pride" is a 100% recycled product. There is a program in California in which discarded latex is used as a minor raw material in the manufacture of new paint. This appears to work well with large batches of new paint and small amounts of discarded latex. In our region there is a lot of discarded latex, and manufacturing is done in relatively small batches, so an alternative way of using discarded latex was needed. The 100% recycled paint may be more widely implementable.

Most important of all, the latex paint project has truly been a community project. The involvement of the local paint industry in reprocessing and marketing has been critical. Without this interest and participation, the project could not have taken place. Local governments are responsible for diverting household hazardous wastes from municipal waste streams, but the private sector handles the wastes we collet. The name "Community Pride" was chose because recycled latex paint represents a community solution to a community problem.

FIGURE 13 APPENDIX 1

PAINT RECYCLING/DISPOSAL PROJECT

LATEX PAINT SORTING MANUAL

PROJECT OVERVIEW

Congratulations! You are participating in an exciting experiment. We are attempting to show that latex paint can be recycled into new paint, or disposed in a more affordable way. If successful, the project could significantly improve the economics of future household hazardous waste management.

The Paint Recycling/Disposal Project is the nation's most detailed evaluation of paint recycling and disposal and there is a lot of interest in what we will find. The project is funded by Seattle's Solid Waste Utility, with support from the Washington State Department of Ecology.

Your role is to inspect the incoming paint, sort it and bulk it into drums. **Sorting is the key step to successfully recycle or landfill latex paint.** How well the paint is sorted today at the Round-Up will determine the project's success or failure.

Latex paint will be sorted into three groups

- **Hazardous Waste.**
- **Disposable Latex** (for landfilling); and
- **Recyclable Latex**

Each group will be handled separately once it is sorted, as described on the next page.

Hazardous Waste is not bulked. Put the lid back on securely and set it down to the sorter's right. Your Technical Supervisor will periodically clear it away for proper disposal.

Disposable Latex is bulked into drums marked with a RED label. This paint will be sampled and tested. If non-hazardous, it will be landfilled at the Cedar Hills Landfill, saving a lot of money.

Recyclable Latex is bulked into drums marked with a GREEN label. It will be reprocessed, and sold as new recycled latex paint.

A Sorting Protocol is described in the pages that follow.

A Technical Supervisor will provide you a training session about the Sorting Protocol, and will be available throughout the Round-Up to answer any questions you might have.

THANK YOU, AND GOOD LUCK!

(2)

PAINT RECYCLING/DISPOSAL PROJECT

LATEX PAINT SORTING MANUAL

TABLE 1

SORTING PROTOCOL

TYPE OF PAINT	RECOGNITION TRAIT	HANDLING METHOD
Empty/dried cans	Weight, no liquid	Dumpster
Solvent paint, lacquers, stains, unknowns	Label, look, odor	Hazardous Waste
Lead latex	Label, color (white, orange, yellow)	Hazardous Waste
Mercury latex	Label	Hazardous Waste
Dark latex	Color (darker than paint chip)	Disposable Latex
Sour latex	Odor	Disposable Latex
Frozen latex	Look ('sawdust')	Disposable Latex
Physically compromised latex	Look	Disposable Latex
Light latex	Look (lighter than paint chip)	Recyclable Latex

Detailed instructions are provided below for recognizing some of these paints. Ask your Technical Supervisor if you have any questions after the training session.

PAINT RECYCLING/DISPOSAL PROJECT

LATEX PAINT SORTING MANUAL

DETAILED SORTING INSTRUCTIONS

1. SOLVENT PAINT, LACQUER AND STAIN

A. PAINT LABEL:

Front Panel:

- o Does not say "latex", and
- o Says "Alkyd", "Lacquer" or "Stain"

Side Panel:

- o Says "Cumbustible", "Flamable" or "Inflamable".
- o Cleaning Instructions say to use paint thinner or mineral spirits.
- o Ingredients list mineral spirits or petroleum distillate – not water or glycols.

B. CONTENTS:

- o Looks different than latex.
- o Smells like solvent.

C. DISPOSITION: HAZARDOUS WASTE

2. LEAD PAINT

A. OLD PAINT LABEL:

Front Panel:

- o Says "Lead"
- o Indicates it is Exterior Wood Primer (white)

B. CONTENTS (old label):

- o Orange or yellow (stir)
- o White [primer] (stir)

C. DISPOSITION: HAZARDOUS WASTE

3. LATEX WITH HIGH MERCURY CONTENT

A. PAINT LABEL (exterior latex):

- "Mildew Resistant"
- "Anti-fungal"
- "Phenyl Mercury Acetate", "PMA"
- "Phenyl Mercury Oleate", "PMO"

B. DISPOSITION: **HAZARDOUS WASTE**

4. DARK LATEX

A. CONTENTS:

- Stir first; latex color darker than paint chip provided by Technical Supervisor.

B. DISPOSITION: **DISPOSABLE LATEX**

5. SOUR LATEX

A. ODOR:

- Smells rotten!

B. DISPOSITION: **DISPOSABLE LATEX**

6. FROZEN LATEX

A. CONTENTS:

- Freeze/thaw has taken solids out of suspension. Precipitate looks like "sawdust".

B. DISPOSITION: **DISPOSABLE LATEX**

7. LIGHT LATEX

A. CONTENTS:

- Stir first; latex color lighter than paint chip provided by Technical Supervisor.

B. DISPOSITION: **RECYCLABLE LATEX**

PAINT RECYCLING/DISPOSAL PROJECT

LATEX PAINT SORTING MANUAL

JOB DESCRIPTIONS

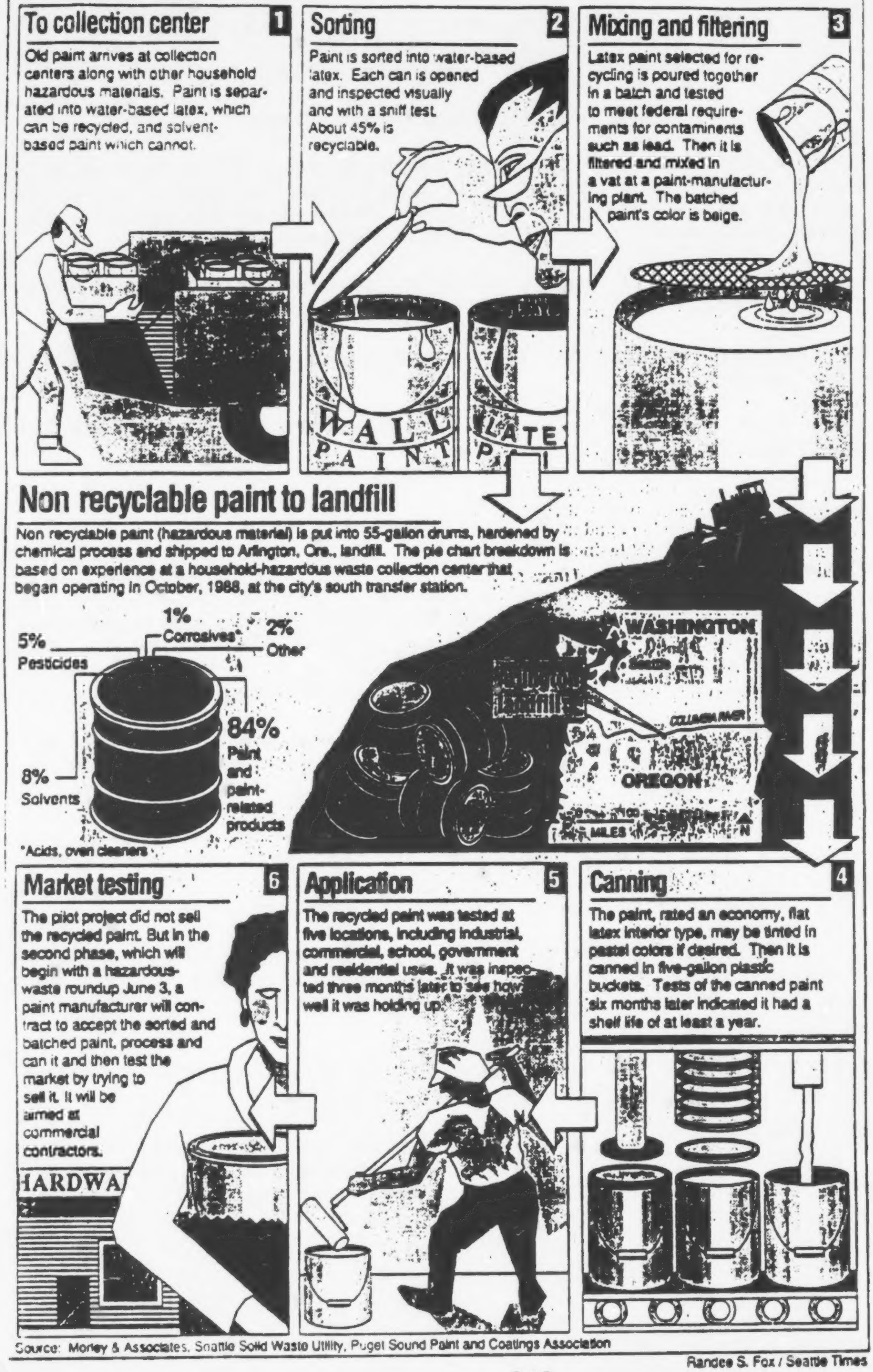
SORTERS:

- Throw dried and empty cans in dumpster;
- Inspect labels;
- Open can lids;
- Inspect contents (visual and odor);
- Sort paint into:
  - Hazardous Waste
  - Disposable Latex (red drums)
  - Recyclable Latex (green drums)
- Notify Technical Supervisor if you have a question or an unknown.

BULKERS:

- Empty sorted cans into appropriate drums;
- Throw empty cans in dumpster;
- Notify Technical Supervisor when drums are full;
- Notify Technical Supervisor when a paint is mis-sorted.

Recycling old paint



To collection center

Old paint arrives at collection centers along with other household hazardous materials. Paint is separated into water-based latex, which can be recycled, and solvent-based paint which cannot.

Sorting

Paint is sorted into water-based latex. Each can is opened and inspected visually and with a sniff test. About 45% is recyclable.

Mixing and filtering

Latex paint selected for recycling is poured together in a batch and tested to meet federal requirements for contaminents such as lead. Then it is filtered and mixed in a vat at a paint-manufacturing plant. The batched paint's color is beige.

Non recyclable paint to landfill

Non recyclable paint (hazardous material) is put into 55-gallon drums, hardened by chemical process and shipped to Arlington, Ore., landfill. The pie chart breakdown is based on experience at a household-hazardous waste collection center that began operating in October, 1988, at the city's south transfer station.

*Acids, oven cleaners

Canning

The paint, rated an economy, flat latex interior type, may be tinted in pastel colors if desired. Then it is canned in five-gallon plastic buckets. Tests of the canned paint six months later indicated it had a shelf life of at least a year.

Application

The recycled paint was tested at five locations, including industrial, commercial, school, government and residential uses. It was inspected three months later to see how well it was holding up.

Market testing

The pilot project did not sell the recycled paint. But in the second phase, which will begin with a hazardous-waste roundup June 3, a paint manufacturer will contract to accept the sorted and batched paint, process and can it and then test the market by trying to sell it. It will be aimed at commercial contractors.

Source: Morley & Associates, Seattle Solid Waste Utility, Puget Sound Paint and Coatings Association

Randee S. Fox / Seattle Times

Central Vermont Regional Planning Commission
Montpelier, Vermont
Michael Bender, Solid Waste Planner

PAINT DROP AND SWAP, FALL, 1989

The Central Vermont Regional Planning Commission worked with the State Solid Waste Division in developing Vermont's Drop and Swap for Paint. This State funded demonstration project was determined successful for the following reasons:

1. 50% of the 1500 gallons of paint brought in was diverted as usable, thereby saving significantly on disposal costs.

2. Hazardous disposal of the remainder was bulked in a cost effective manner.

3. The event raised public awareness of the issue of hazardous waste; and

4. A number of Vermont's 12 regions have already expressed interest in hosting their own paint drop and swap.

Although HHW makes up less than 1% of the municipal waste stream, it's estimated that Vermonters (State population of 500,000) annually landfill 3.5 million pounds of HHW. Because over 50% of the volume brought in at a collection day was paint, the State approached Central Vermont about hosting a pilot to determine the feasibility of hosting a collection event just for paint.

When planning out Vermont's first drop and swap, Central Vermont's HHW Task Force split the workload between 3 committees; logistics, volunteers, and publicity. The Task Force began by setting a publicity timeline which included developing this fact sheet. It not only announces the date and time of the event, but also explains the purpose, funding, and sponsors and what paint products residents could bring and take away. 200 of these 50 page pads were posted in the Central Vermont region.

On the flipside of the page, waste reduction suggestions were listed and a map was provided. The site allowed plenty of room for long lines of cars and easy access for emergency vehicles, if necessary.

Preliminary safety precautions included notifying local authorities and having a safety eyewash on site.

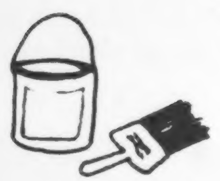
Newspapers, radio stations, and the nightly news ran our story. As a result, over 5% of Montpelier's households participated, including drop offs and pick ups by over 400 residents.

FIGURE 14

PLEASE TAKE ONE! PLEASE TAKE ONE!

PAINT DROP AND SWAP

SATURDAY SEPTEMBER 23, 1989
Rain or Shine
9:00 A.M. to 2:00 P.M.
132 State Street Parking Lot - Montpelier, Vermont
(See map on back)



Bring or Take Away

- Latex or solvent-based paints
- Stains
- Paint Strippers
- Paint Thinners and Brush Cleaners
- Preservative Stains

Products containing Pentachlorophenol can not be accepted and should be used up or saved for a Household Hazardous Waste collection.

SPONSORED BY
Vermont Agency of Natural Resources
COORDINATED BY
the Household Hazardous Waste Task Force of the Central Vermont Regional Planning Commission

This demonstration project is one of the many solid waste management programs paid for from tax funds collected at all Vermont landfills. There will be NO DIRECT CHARGE to individual households to participate in this PAINT DROP AND SWAP. Expected costs for this project are approximately $4,000.

Commercial quantities will be accepted for a fee and must be pre-arranged by calling Pollution Solutions at 860-1200.

SOMETHING FOR EVERYONE

Come find that special color you've been looking for or unload your basement of half empty cans of paint. At the end of the day all remaining useable paint will be bulked by a professional paint specialist and made available free of charge to anyone interested in "recycled tones" primer paint. For more information call the Recycling Hotline at 1-800-932-7100 or see other side.

THANKS: Central Vermont Regional Planning Commission • Pollution Solutions • Sherwin-Williams • Ben & Jerry's • Central Vermont Solid Waste Management District • A.W.A.R.E. • Vermont Green Up, Inc. • Queen City Fire Equipment, Inc. • Central Vermont Landfill • Green Mountain Sanitation

Recycled Paper

This Paint Drop and Swap is a demonstration project, designed to assist solid waste regional organizations in dealing with paint and paint products, which are 50 - 80% of the household hazardous waste stream. The concept is that each region will hold yearly Paint Drop and Swaps.

SOME PAINT FACTS

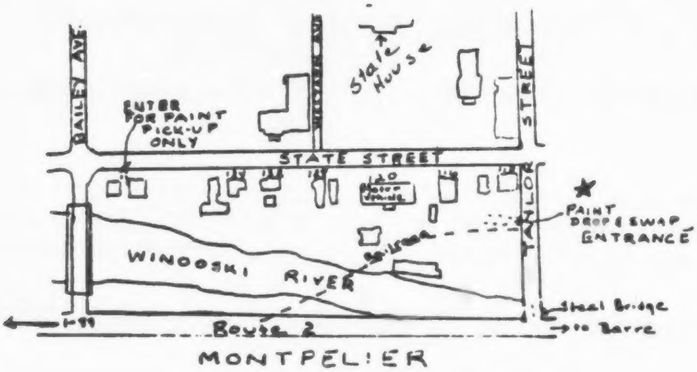
—Oil based paints are hazardous because they contain solvents that can pollute ground and surface waters, and are flammable.

—Latex paints are composed mostly of non-toxic materials, though some latex paints do contain trace amounts of hazardous constituents, such as heavy metals used for coloring. Latex paints can be disposed of with household trash provided the leftover paint is allowed to dry completely.

—Paint thinners and similar products (turpentine, mineral spirits) can be reused. Let these used solvents sit in a closed container to allow the paint particles to settle out. Then pour off the clear liquid for reuse. Add an absorbant (i.e. cat litter) to the residue and let dry.

—The total disposal cost of a 55 gal. drum of waste oil-based paint ranges from $139 to $600.

Further information on the disposal of the hazardous waste collected at the Paint Drop and Swap will be available on the paint drop and swap day.



WHAT YOU CAN DO

- Buy only what you need. Don't buy a gallon when a quart will do.
- Find someone who can use your leftover paint.
- Organize your neighborhood to swap paint.
- Encourage your local paint supplier to stock the least toxic paint products.
- When possible buy water base (latex) paint.

MORE THANKS: State of Vermont Department of Environmental Conservation • The Departme Buildings • The Agency of Development and Community Affairs • The Department of Agricu

Volunteers greeted the people entering. Residents wanting to drop off were directed in line. Others interested in picking up usable paint were redirected around the block to a designated parking lot.

Other volunteers distributed surveys which were used to determine distances traveled. 90% traveled 15 miles or less. Residents were also asked how future events should be funded, 50% preferred State funding, 21% user fees, and 1% district funding.

Signs were posted along the way for awareness purposes, and down at the head of the line, surveys were collected, and HHW Awareness Wheels were distributed, which listed problem products and some safe alternatives.

After that point, cars were directed intc 2 lanes. Like a collection day, it's critical to have experienced screeners. Residents were encouraged to store unacceptable materials until the scheduled State HHW collection day in the spring of 1990.

Volunteer runners carried the paint to be further identified, weighed, and recorded. Over 50 volunteers worked a total of 200 hours processing the paint.

The usable paint was color coded and sent to the usable pick up tent. The cans piled higher and higher near the end of the 5 hour period and this was tiring, especially for our respirator wearers, who were fitted for the masks. In addition, all volunteers opening paint were required to wear safety glasses and gloves. The bad paint was bulked into 55 gallon drums and one suggestion given was to cut a 1/2" by 1/2" perpendicular knotch at the base of the upright receptors to be better able to scrape underneath the rim of the can. Paint continued to be bulked the rest of that day and another 12 hour day as well. 100 of the 5 gallon buckets stacked in the background were later filled with usable paint. In total, Sherwin Williams blended 400 gallons of latex, 85 of oil based, and 15 gallons of stains.

Camps, schools, low income housing projects, and theatre groups came to pick up 5 gallon buckets of usable paint, which was bulked into light and dark batches.

Of the remaining 750 gallons of hazardous waste, the material was bulked, loaded and trucked by a licensed firm to an incinerator at a cost of $7,000. Around $1500 was spent for the drop and swap kit which includes a tent, respirators, safety glasses and gloves, and is now available to the regions. All totaled, approximately $9000 was spent, not including staff time.

In summary, besides the usual collection day preparations, the following recommendations should be considered when planning a paint drop and swap:

1. Over 50% of the volume at a collection day is paint. By holding a drop and swap for paint, you are able to remove the usable paint for reuse.

2. Start planning early; public awareness through media publicity and education is critical for good participation. Planning logistics and lining up shifts of volunteers is also crucial.

3. All who open cans or are near opened paint should wear respirators.

4. Have a contingency plan so if back logged with paint the usables are not bulked as hazardous.

5. Have all the hazardous paint bulked and loaded the first day; bulk the good paint the second day.

6. Plan events requiring respirators during the spring and fall to avoid excessive heat for volunteers.

In conclusion, to minimize the burn option to the greatest extent possible, we need to prioritize waste reduction in paints and in the HHW stream in general by developing strategies such as waste exchanges for diverting the usable portions. In the process, we can limit environmental degradation and expensive disposal costs and promote increased public awareness about the need for toxicity reduction as one crucial part of a comprehensive solid waste plan.

An Inexpensive Paint Can Crushing System

by George Kinney

Dakota County is one of seven metropolitan Counties in Minnesota, located directly south of St. Paul and Minneapolis. It is the fastest growing county in the state. Since 1985, we have held thirteen one day household hazardous waste collections. The first collection, in 1985, was held in conjunction with the Minnesota Pollution Control Agency (MPCA) and was the first in Minnesota. We are planning to have a permanent household hazardous waste collection site open this spring. We will continue to do one day collections since they serve a unique purpose.

In Minnesota, paint that is collected is hazardous waste. The mercury content in the latex paint is high enough to classify it as hazardous waste. Under Minnesota statute, household hazardous waste loses its exemption from hazardous waste regulation when it is collected.

During the four 1989 household hazardous waste collections, 3025 gallons of latex paint and 2200 gallons of oil paint were bulked into 55 gallon drums. Dakota County collections are open to the public from 9:00 until 3:00 on Saturdays. Because of the amount of paint dropped off, unopened paint cans tend to accumulate when using traditional methods. Initially paint is sorted into latex and oil, opened and stirred with a stirring stick to mix the paint, then poured and the can is scraped to remove the last of the paint. Empty cans are placed in a rolloff. At our collections we usually have two 30 yard roll off's, and we frequently fill both. We have two private landfills in Dakota County and have worked out an agreement with one of them to take our waste paint cans after the cans have sat for 10 days in a plastic lined rolloff with 30 bags of floor dry added.

After 5 years of having volunteers scraping paint cans, we had to come up with an easier method of handling paint. Our collections are community based and dependent on volunteers. Dakota County acts as the sponsor and the hazardous waste generator. Before each collection businesses are invited to join as sponsors to provide volunteers and hopefully carry a portion of the cost of the collection. We have had several collections which have taken us a day and a half to scrape all the paint cans, we didn't have the volunteer base we needed. We wanted to find another way to handle the work in the paint area so we could reduce our volunteer work force and make the job easier.

During the summer, the planning group for the City of Inver Grove Heights held several meetings to talk about the paint handling issue. The group was aware that they needed about 30 to 40 people scraping paint cans to process the paint in a normal time period. Their idea was to buy a paint can crusher complete with rollers, gears, aprons, drive belts and all the rest which cost about $12,000. We thought that the maintenance involved in cleanup on the machine would make it unworkable. During one of the evening meetings I suggested using a simple log splitter to flatten the cans. Within two weeks of that meeting, the City of Inver Grove Heights had purchased two units and modified them and used them during their fifth annual collection. This log splitter, before we modified it, cost $810.00 compared to the $12,000 unit.

To modify the log splitter, the v-shaped wedges are removed and plate steel is welded to the ram and stationary plate. Bronze plates are attached to reduce chance of sparks. A steel plate box was welded around the ram assembly to hold the cans and a catch basin was welded in place to direct the paint to five gallon pails. Since one of our goals at our collections is to operate a swap table, recycling as much paint and other materials as possible, we must open each can of paint to see if it is usable. Winters in Minnesota may get as low as 35 below zero, and any latex sitting in a homeowner's garage will not be usable, which is one reason we get so much paint at our collections.

Using these machines, paint is accepted, opened, and sorted as usual. Paint cans are then drained of paint that will easily drain. Then the cans enter the paint crusher.

This slide shows the unit we use for oil paint with the engine and the hydraulic reservoir separated on a pallet kept a distance away to prevent any spark problems. To operate the unit, paint cans which have drained and have material remaining on the bottom of the cans are placed into the unit four at a time. Then the lid is closed which activates the arm, the ram forces the paint sludge out like toothpaste. The semisolid paint is forced through a series of holes about an inch in size at the stationary end of the unit. The hydraulic ram is reversed and the cans are removed and scraped. The flattened paint cans are placed in a rolloff box to dry. Our test have shown that thirteen days will dry the remaining paint adequately, after which they may be landfilled.

The unit we use for latex paint has the engine mounted on the unit rather than separated. This unit also has plate steel welded to form a system to hold the paint cans. Again this unit has a similar catch basin system for the paint. This unit is different in that it has a two way ram, allowing twice as many paint cans to be placed in it at once. The ram is operated first one way and then the other way to crush all the cans. The arm is then returned to the center and the cans are scraped of the small amount of paint in the center and placed in the small roll off.

As was said earlier, we have attempted to find a solution to our problem, which was that we needed to process paint at a faster rate. Last year at the City of Inver Grove Heights, which built and owns the two machines, we spent a day and a half to process the paint from the six hour collection, while this year, at the same size collections using the two crushing units we were cleaning the units up at 4:00 PM and the volunteers were all in their cars by 5:00 PM going home. We have seen a very substantial reduction in labor time which is essential in a volunteer-based system. The total cost of these two units, with modifications was less than $3,500.

If we design and build additional units, we are planning to make them easier to clean at the end of the day. Currently the entire unit is welded together and it is very difficult to get in and do a proper cleanup. We envision building the units with the same heavy gauge steel, but bolted together rather than welded, so that clean up would be faster. Dakota County is planning to have a couple of these units stationed at each permanent site to allow for easier paint bulking at those stations. Thank you.

Cynthia C. Fridgen
Assistant Professor,
Solid and Hazardous Waste Mngt.
Resource Development Department
Michigan State University

ENVIRONMENTAL EDUCATION: The Relationship Between Perception and Action.

The perception of the problem of waste management is the problem of waste management. Citizens are concerned about groundwater contamination from leaking landfills, air pollution from Waste-to-Energy facilities, adequate landfills for the proper disposal of ash from waste-to-energy facilities, reduction of their land values due to the proximity of any waste management facility. They expect manufacturers to manufacture without polluting. They expect chemical companies to produce safe products that provide convenience to the consumer. Too often it is difficult for the consumer to see the relationship between their own behavior and the far-reaching impacts of environmental pollution. The small amounts of toxic materials discarded by the typical citizen would not seem to be a problem. Herein lies the problem with the awareness of environmental issues and the challenge to professionals in the field of environmental education.

It is difficult for the general public to perceive themselves as a direct cause of environmental pollution through the improper use and disposal of common household products. It is even more difficult to perceive what difference they, as individuals, can make to correct the problem. Since perception is truth and since awareness is the basis for perception; the task of educators is to enhance awareness, increase knowledge and change behavior.

The most frequent source of information in this country is the press. The charge of a good newspaper reporter is to expose the perpetrator of environmental problems to the citizen. It is unlikely that these same sources of information will analyze the solutions to environmental problems to include the reader. Awareness stops at the point at which the reporter would draw the reader into the article as a part of the problem. However, if the media is going to perform the role of a true educator at the community level, and it would seem an appropriate role, then they need to be brought along in both content and process training to perform the role effectively.

As long as the reader perceives "others" as the problem, the reader will not perceive himself or herself as a part of the solution. The awareness level educator needs to create the condition of cognitive dissonance for the consumer.

It is not just a matter of the convenience of pointing a finger at industry, agencies and business as the responsible parties; it is also the confusion of understanding those industries, agencies and businesses, and how they operate. It is understanding and being aware of the interface between one's own behavior and the decisions that industries, agencies and businesses make. We need to learn the relationship between our individual consumer behavior and a clean, quality environment.

Household Hazardous Waste Management is an environmental issue, an economic issue and a political issue, but most of all; it is a community issue. Education at the community level is essential if a clear understanding of the issue is going to be established.

In each case, the questions are:

0 Who is going to educate?

0 What form is the education process going to take?

0 Who is the target audience?

AWARENESS

WHO:

The teacher with specialized information on Household Hazardous materials becomes the primary educator. This teacher then enhances the information base of the second level educator, which is the media professional.

The news media is often the educator at the awareness level. Radio and television contribute heavily to citizen awareness of any environmental problem. In the area of toxic waste it is the media professionals who report water contamination problems at the local level. News broadcasts highlight agency action against environmental polluters. Television public service announcements encourage citizens to call for assistance to dispose of waste materials.

Media professionals can be important partners as we strive to enhance citizen awareness. Unfortunately, the media profession rarely provides opportunities for members to study an issue in great depth. Opportunities for learning about the household hazardous waste issue need to be extended to newspaper, radio and television professionals so that they may enhance awareness of the issue, and of the role that citizens play in impacting the problem. In this case the environmental educator, who may be a local teacher, an agency staff person, or a University professor would educate the media to provide accurate, integrated, action-oriented information to local citizens. This effort to educate requires that quality time be spent with media people. In-depth workshops for media people could be implemented on a regional basis. Workshops could be a single day-long event or a series of two-hour workshops held in conjunction with the state media association. In this way, the media is empowered to act as awareness level educators.

METHOD:

Education of the media should be in-depth and ongoing. The media responds to issues of the moment. Educational programs need to be current and concise. A half-day workshop for media professionals on household hazardous waste might include:

1. background of the issue
2. statistics
3. impacts on citizen health
4. impacts on environmental quality
5. alternatives to toxic products
6. management of toxic products
7. disposal techniques and opportunities
8. liability issues
9. costs of disposal
10. the relationship between household hazardous waste and solid waste management

As a follow-up to a specific educational opportunity, the ongoing support of the media might include preparation of sample news releases, or the inclusion of media professionals on the mailing list of a statewide newsletter. In this way, the professional educator enlists an army of outreach specialists to carry the awareness level of the learning process to the public. They can make the public aware of the relationship between consumer behavior and environmental problems.

The efforts of the educator, focused on the media, for awareness level programming results in education of the general citizenry as to the issues at a more substantive and accurate level than is otherwise possible.

AUDIENCE:

Newspaper, television and radio reporters as well as communication specialists for organizations and agencies could be the target audience.

KNOWLEDGE GAIN:

Knowledge gain level education at the community level is essential if appropriate action is going to be initiated. The questions are the same at this level. We need to identify the source, educational method and the target audience.

WHO:

At this level, the credibility of the source becomes essential to a successful educational program. Credentials of the teacher need to be well-documented. It is helpful if the teacher enjoys an affiliation with an established credible institution within the community. Perception of the teacher as an unbiased source of current factual information is absolutely necessary. With all of this criteria established, the audience can concentrate on relating the information to their own set of beliefs and values; not worrying about the truth of the information.

METHOD:

Knowledge gain education can be implemented at the youth level in a formal classroom setting or in an informal setting such as youth clubs, camps or summer parks programs. These programs can follow a prescribed curriculum or be a series of speakers. At the adult level, knowledge gain education can take the form of formal classes at a Community College or University; can be one-day workshops or a series of evening workshops. The secret of this level of learning is that it must instill in the learner the confidence to discuss the issue. In this way, the learner becomes the teacher and disseminates the content of the workshops to other members of the community.

In the knowledge gain learning experience, both content and process need to be taught. The learner must understand the issue and how to share the information with others. The educator creates knowledgeable leaders within the community.

AUDIENCE:

Based on well-known literature in the area of information diffusion, it is advisable to recruit a core group of individuals in the community who have already accepted roles as community leaders. These are not necessarily innovators or activists, but instead are community leaders who have established credibility within the local community and are trusted to represent the community viewpoint on certain issues. These individuals must be courageous when it comes to bringing new ideas to the community as a whole. Accessing this core of credible community leaders is essential if knowledge gain educational efforts are to be effective.

BEHAVIOR CHANGE:

Ultimately, people need to change their behaviors if a long-term impact is to be realized. Behavioral change is probably the most difficult outcome to realize from educational programs. Too often citizens will listen, respond appropriately, and even reteach the material to others and not change their own behavior. Education for behavioral change must have several elements to be successful.

1. Learners must clearly see the relationship between their behavior and the environmental problem.
2. Learners must clearly understand the relationship between their changed behavior and the solution.
3. Learners must have a clear understanding of the mechanisms of behavioral change (i.e., tools, cost, time, etc.)
4. Learners must take personal responsibility for the success or failure of environmental protection programs.

WHO:

The role of the educator at this behavior change level is a very practical and applied role. In this case, it is advantageous to have professionals in the waste management field as educators. This list might include: hazardous waste haulers, Health Department personnel, toxicologists and representatives from other communities which have implemented successful Household Hazardous Waste management programs. At this level of education, the state Department of Environmental Resource Management could play a strong educator role as they document sites of environmental contamination. In many cases, these sites are Type II landfills. It is quite likely that household hazardous waste contributes to contamination leaching from these sites. In addition to the credible source of information, members of the education team must have resources to share with the learners. This education level must be enabling in nature in order to effect behavioral change.

METHOD:

At the behavioral change level, the education process must be applied. This may mean site visits to hazardous waste facilities, participation in household hazardous waste collection programs, or involvement in the preparation of material for use in youth education activities. At the household level, the learner could develop an inventory of all their home products with hazard labels, or check supermarket shelves to inventory products which are non-toxic for home use. The learner could research non-hazardous alternatives for each item on the inventory (for some there is no alternative). The learner could become involved in raising funds for a Household Hazardous Waste Collection Day.

The visibility and commitment, exhibited through activities, supports and solidifies behavioral change. The learner internalizes the desired behavioral change and it becomes part of his/her value system.

AUDIENCE:

In most cases, the same individuals involved in the knowledge gain level go on to the behavioral change level. Knowledge gain is a necessary precursor to behavior change. However, there can be knowledge gain without behavioral change. The other difference is that the extent of knowledge gain needed to empower community leaders to reteach is greater than that which is necessary for the community at large to effect behavioral changes. The general public needs to understand the relationship between their behavior and the problem; enough to impact their perception and support a behavioral change. Community leaders committed to supporting that behavioral change, through reteaching of the information they have learned, will want a broader understanding in order to respond to a variety of learner levels.

SUMMARY:

Utilizing educational resources available in most states, the educator can build a hierarchy of learning which:

1. enhances community awareness of the issue in a current and substantive context,

2. expands the knowledge base of the community to create a cadre of informed community leaders capable of educating others, and

3. provides the tools and experiences necessary to effect behavioral change for a critical mass of citizens.

This Community education process builds on the concern of a community to come together to identify their problems and needs, seek solutions from within, mobilize resources and execute a plan of learning and action. [1] On the issue of Household Hazardous Waste Management Education, the community has an interest in protecting their environment and subsequently the health of their members now, and in future generations. The process described in this paper is a method of teaching and helping learners make the connection between their learning and its direct application. More specifically, this process will help make community members more aware of the realities of the impact that Household Hazardous materials can have on the environment and enable community leaders to do something about it. The outside educator becomes the catalyst and sets in motion an activity which enables the community to effectively maintain its own knowledge base and become a self-sustaining classroom.

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[1] Adapted from: Compton, J.L. and McClusky, H.Y., Community Education for Community Development, 1978, p. 229.

Educational Tools

Leslie Lewis
Citizens' Participation Coordinator
Connecticut Department of Environmental Protection

In order for any kind of HHW program to work, there must be a strong emphasis on public education. This can fall into two categories: publicity regarding a specific collection event or facility, and education on the proper use, disposal, and ultimately, reduction of hazardous materials around our homes. There are a number of tools which can be used to get your message across. Some of these will be discussed below.

One of the obvious means of communication is through the mass media. Television, radio, and particularly newspapers offer relatively access to large numbers of people. In many areas, community access cable television stations have put together special programs on HHW. Talk shows, news broadcasts, and public service announcements can also be utilized.

Printed materials in the form of flyers and brochures can both publicize your event and contain educational material. These can be distributed through libraries, town halls, post offices, and other high-traffic areas. You may also find that local grocery stores will stuff flyers into shopping bags. There is a wide array of printed matter available, much of which will be on display at this conference. Don't be afraid to ask permission to copy or reprint existing information. There is definitely no need to re-invent the wheel where HHW is concerned.

More expensive, but possibly more effective, are mailings directly to residents in the collection service area. Towns is Connecticut which have used direct mail have experienced fairly high participation rates. One way to cut down on mailing expenses is to have stuffers prepared which can go out with tax bills or other town-wide mailings. Sometimes a local utility is willing to include HHW information with their monthly billings.

If you have access to good speakers on HHW, you have many opportunities to get the word out. Meetings can be sponsored by municipal officials or agencies and the general public can be invited to attend. Organizations like rotary clubs, garden clubs, church groups and the like are always on the lookout for speakers.

Posters, signs on town greens, and banners placed over roads can advertise HHW collections. If you plan ahead, you can develop a sign or banner which can be changed from year to year to reflect changes in times, dates, or places of collection. Posters can be placed around town to alert the public to an upcoming event.

Local businesses and industry can be recruited to help in the education effort. Larger companies may be willing to put an article about HHW in their employee newsletters. Other firms might be willing to include an insert along with paychecks. Many business have contributed printing, graphic design, or other in-kind services to groups coordinating HHW programs.

Permanent collection programs need on-going education to ensure continued participation. In San Bernadino County, the health department developed a character called Haz Man who served as the program mascot. Haz Man appeared at local schools to publicize collection centers and the HHW issue, and his likeness adorns key rings, refrigerator magnets, and flyers. Clearly this type of publicity does not come cheaply, but it should be built into the operating budget of a permanent facility.

Schools are certainly an important outlet for HHW education. Not only can school children help influence their parents' participation in collections, they will also be receiving information which will make them more critical consumers of hazardous products in the future. Several HHW curriculum packages have been designed which cover all grade levels. HHW is an issue which cuts across the boundaries of science, social studies, math, economics, and other disciplines. Poster contests have been sponsored by art classes which generate enthusiasm among students, interest among parents, and posters to display around the community.

Don't forget to utilize some of the community education experts in your area. The Cooperative Extension Services, Soil and Water Conservation Districts, the Granges, and other entities can promote sound HHW management, including the use of alternative products. Your library might be willing to set up a HHW resource center where people could come for information.

These are by no means all of the tools available to those interested in informing and educating the public about HHW. If there is a method which you think will work in your community, by all means try it. Be creative.

NON-COLLECTION HHW EDUCATION

Sondra Goodman, Director, Household Hazardous Waste Project, Springfield, Missouri

The concerns associated with hazardous products within our homes are at least two-fold: the effect these products have on our health when they are used and stored; and how the unused or leftover portions must be properly disposed of to avoid environmental damage. Even if you are unable to spend a single penny on a collection program for hhw there is still much effective education that can be done to protect people in your community from inadvertently harming their health and environment. In a non-collection education program the emphasis is on source reduction rather than disposal of the subsequent waste.

Hazardous chemicals in consumer products are exhibiting untoward side effects. According to the Board of Environmental Studies and Toxicology of the National Research Council (the research branch of the National Academy of Science), fifteen percent of the population experiences hypersensitivity to chemicals found in common household products. Additionally, EPA's National Human Adipose Tissue Survey, the longest running project for monitoring toxins accumulating in human fat samples, reports that 100 foreign chemicals (out of the roughly 350 tested) have been found in more than half of the human fat samples analyzed. Perhaps as disconcerting is recognizing that nothing is known about the health and environmental effects of the millions of synergistic mixes created by the tens of thousands of chemicals which are mingling in our food, air, soil, and water (including cellular water).

Hazardous waste is what's left from processes and products which use hazardous chemicals. Reducing the source of the hazard rather than just hoping to safely dispose of hazardous waste is paramount for the long-term protection of our world's health and environment.

A Case Study on Non-Collection HHW Education

Founded in 1987, Missouri's Household Hazardous Waste Project provides community education unattached to collection*. HHWP is a program of the Environmental Improvement & Energy Resources Authority, an agency of the Missouri Department of Natural Resources. We are administered by Southwest Missouri State University's Office of Continuing Education. HHWP has grown from a single-county program to providing statewide education by 1992. Our expanded target audience includes elementary & secondary teachers and their students; householders; local governments (county specific Advisory Committees, city managers, public works officials); state agencies (University Extension Service, the Department of Health, the Department of Natural Resources); and the state legislature.

The elements of our non-collection education program are awareness, informed decision-making through knowledge gained; and changes in practice or behavior. Tools of HHWP's program include coalition building, use of the media, educational materials, training and continuing education credits for training, recycling options for household hazardous waste, secondary education learning activities, an information request line, speaker's bureaus, county-specific education programs, and a clearinghouse for the extremely useful hhw materials developed by others.

HHWP is still young and learning. But based on our three years of experience we are suggesting possible steps, topics, and educational tools, which you may find helpful in setting forth a non-collection education program in your community.

Suggested Steps in Setting up a Non-Collection Education Program

1. Build a support base
   A broad-based coalition can give your program increased flexibility and visibility. What other groups and individuals in your community are working on issues that interface with associated concerns of household hazardous products and their

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* In Missouri, there are two entities that address the issues of household hazardous materials: the Household Hazardous Waste Project (HHWP) and the Department of Natural Resources (DNR). In 1987 DNR was given the responsibility for the collection and disposition of unregulated quantities of hhw, but they were given very little money to accomplish this big mission. To date, there has been one hhw collection. Three more collections are being planned for 1990.

subsequent waste? Some possibilities include health care workers, environmental organizations, League of Women Voters & other civic organizations, parent-teacher organizations, American Lung Association, American Red Cross, city officials, libraries, retailers, landfill owners & operators, trash haulers, wastewater treatment personnel, water district officials, educators, universities (e.g. geosciences, chemistry, consumer & family studies, business & marketing, etc), University Extension, state Health Departments, Environmental Protection Agency, and other natural resource education/protection entities. See what materials others have that you might use and what materials you might develop that they can use. Work synergistically; share the credit!

2. Identify the Problems and Topics you will address
   Set realistic objectives to meet your goals; set a project by timeline matrix for the coming year. Education may focus on a single concern (e.g. safer art materials; alternative cleaning products) or may be much more comprehensive. Any amount of education is better than none!
3. Establish a Resource Library
   This is an essential reference tool and very necessary for keeping current on research. Begin to research and develop expertise on the problems and topics you'll be addressing.
4. Identify your Resources
   Develop a list of expertise including local, state, & national contacts. Dividing resource contacts into categories such as emergency, health, water quality, disposal, pesticides, consumer protection, funding, materials distribution, speakers, etc. may be helpful.
5. Identify your Audience(s)
   Who will benefit most from your information now? In one year? In two years? Think about a way to set audience priorities should the demand for your education program exceeds your abilities.
6. Educate your Support Base
   Learn from and with one another at regular gatherings or meetings.
7. Research and Develop Waste Management Options
   Before you begin your public presentations, take time to determine what options are locally available for handling hhw. Will the fire department take unwanted ammunition and fireworks? Will your local fire department take household quantities of gasoline and other fuels? Will your wastewater

treatment facility take household quantities of acids and bases and neutralize them on-site? Are there low-income housing groups or theater groups that would welcome usable paint? Often there are already existing recycling opportunities for motor oil, transmission fluid, antifreeze, automotive batteries, and mercury-oxide & silver-oxide batteries (check with local jewelry and hearing aid stores to see if they recycle these button batteries). Collecting this info and publicizing it will let others in your community know that this opportunity exists.

8. Research and Develop Educational Materials
   Empower your audience by providing them with actions and activities that they can participate in to impact upon the problems. Be prepared to talk twice as much about solutions as you do about the problems. Materials may include brochures, posters, fact sheets, guides or reference books, waste exchange survey, in-home survey, recycling lists for hazardous & hazardous materials, community action packets, displays, audiovisuals, theater skits, plays, rap songs, legislative updates, boardgames and other games, curricula, etc.
9. Form a Speaker's Bureau
   Provide your speakers with ideas and materials. Hold information exchanges among speakers to see what tools they have discovered and found to be effective.
10. Create Information Avenues
    Provide materials to already existing agencies and organizations. Work with the media to meet their needs and further your goals. Train others to serve as resources and speakers for their clientele.
11. Evaluate Projects & Programs
    Determine your criteria. Qualitative and quantitative data are valuable. Surveys, evaluations, questionnaires, information and presentation requests may facilitate data collection. What might you do differently if you were given another chance?
12. Share and Report your Discoveries

Make the results of your activities available to others with similar interests and concerns.

Possible Topics for Non-Collection Household Hazardous Waste Education

What makes a product hazardous

- Hazardous properties, routes of exposure, acute and chronic health effects and general categories of common hazardous products
- Safer alternatives

Label awareness

- What's on a label of a hazardous product as required by the FHSA and FIFRA
- Signal words and their specific warnings
- Decoding labels for subtle warnings (*avoid breathing vapors* means you need good ventilation, *avoid skin contact* means gloves required, etc.)
- Ingredients, are they listed?
- Are safe use, storage, or disposal instructions listed?

Consumer action

- Pre-purchase safety checklist

✓ Pre-Purchase Safety Checklist

☐ Do I really need this product?
☐ Have I checked for signal words?
☐ Is there a safer alternative?
☐ Does this product require safety equipment?
☐ Am I buying more than I need?
☐ Can I safely dispose of the excess or does it require a household hazardous waste collection?
☐ Can I safely store this product in my home?

- If you only need a little, borrow from a friend.
- Don't buy products whose ingredients aren't listed.
- Vote with your dollars.
- Tell retailers and manufacturers what you want in a product.

Personal protection

- Read labels.
- Use adequate ventilation.
- Recognize what safety equipment is required and when.
- Choose safer alternatives; they are often less expensive, too.

Waste management options

- Expand recycling outlets for household hazardous waste such as automotive batteries, motor oil, and paint.
- Publish a recycling list.
- Work with local wastewater treatment facilities to neutralize unwanted household quantities of acids and bases.
- Locate waste exchange outlets for useable paint products and cleaning products.
- Coordinate exchanges of unwanted products through churches, civic organizations, neighborhood associations, etc.
- Provide disposal information for various types of household hazardous waste and explain each management option.
- Explain the secure and hold option for waste which cannot currently be safely disposed.
- Link discussion on household hazardous waste with solid waste plans whenever possible.

Possible Tools for Non-Collection Education

- ► Coalition building
- ► Resource library
- ► Informational materials
- ► Media campaigns
- ► Telephone information line
- ► Speakers' bureau
- ► Referral service
- ► Clearinghouse
- ► Data collection
- ► Training
- ► Grassroots education
- ► Elementary and secondary education

EPA NATIONAL CONFERENCE

Household Hazardous Waste

Topic: Industry Education

by Tonie Santos

Introduction

The intent of an educational program is to have everyone manage their wastes correctly all of the time. This can be accomplished by increasing awareness of buying practices, buying too much (especially paint) for example, or buying of unneeded or rarely-used products. With education we can influence changes in buying and use habits.
We can provide information regarding alternative products, safe use, storage and disposal of toxic materials. We can contribute to a healthy environment and make our communities a safer place to live.

I will be discussing today ways in which industry can educate. I will outline some of the tools or vehicles used to promote an education program and then will review various types of programs in which industry has co-sponsored or developed.

General

Industry can provide public education for household hazardous waste collection and non alternative efforts in various ways.

As you will hear throughout this conference, there has and will continue to be discussion on major manufacturers taking more responsibility for the disposal costs of their products. This may be accomplished either by some type of usage tax passed on to the consumer or possibly incentives to distributers and retailers who provide educational material outlining proper disposal methods, with the sale of the product.

Examples

Industry can educate the consumer by providing more comprehensive usage, storage and disposal information on the lables of the products they manufacture.

Another example, is for industry to take a more active role in the development and implementation of an educational program in conjuction with household hazardous waste collection programs. Industry can provide technical information as well as expertise in the handling of these materials to make these education programs more comprehensive.

Major chemical manufactures may be willing to sponsor educational programs and provide presentations or materials to grade school students to educate them on waste reduction measures or safe and proper methods of storage and disposal. These companies are usually very involved in local community efforts and this option should be explored.

As the nation's largest environmental services company, Chemical Waste Management has experience in all aspects of hazardous waste handling, from identification to treatment, recycling, incineration or landfill disposal.

For collection programs, CWMI has teamed up with sponsoring cities, agencies and companies like Waste Management, Inc. to combine efforts and resources in designing and implementing public education programs specific to the city's needs.

These programs can be developed to include information such as source reduction, safe handling and alternate methods of disposal and these programs can also be done in conjunction with your curbside recycling programs where glass, paper, aluminum and waste oil are collected.

Marketing Efforts

Companies like Chemical Waste Management who deal with all aspects of handling and managing hazardous waste, can offer educational services to sponsoring agencies for household collection programs as part of their marketing effort.

We direct our efforts through our communications division.
This effort consists of developing, coordinating and implementing a public education program along with a household collection program.

The public education program consist of many different types of tools that can be designed for the sponsoring agencies specific needs, such as;

o Designing information brochures and coordinating dissemination efforts through various outlets such as local home owners associations, libraries, local governmental and public utility agencies, the school system and the solid waste handling companies. This information could be oriented to a specific collection program or could be designed generically to be used year round as part of an ongoing educational program.

o We have found that handouts are the most effective method of getting attention and participation. In programs we have held, participants will bring to the event, door hangers, fliers or newsletters they have received as part of a distribution effort. These pieces normally advertise specifics of the collection event, such as the scheduled date, location, items considered acceptable or non acceptable, proper containerization procedures and safe transportation information.

Handouts usually generate about a 40 - 60% recognition rate.
Advertisements in newspapers and radio, about 15 - 20%.

o Developing text and providing local media and public service agencies with information regarding the collection program is another effective tool which will also save you money.

o Cooperative efforts from local, social/civic organizations and public agencies are beneficial to the success of the program. We can educate them, gain their understanding and support and possibly their participation through volunteer efforts for the program.

o When we receive calls from residents in cities that do not currently have collection programs, we respond to them by asking them to get their community leaders involved. If you are fortunate enough to have strong political support in your community it is to your advantage to get your support group behind your program. Inform community leaders of the value of your program. Political support can prove invaluable to your program.

Specialized Educational Programs

Permanent programs:

In cooperation with WMNA, we are getting involved in designing and implementing permanent collection programs and facilities where residents can drop off wastes on an ongoing basis. With this type of program implementation of a permanent educational program would be relatively easy. Reinforcement of the educational material is necessary to acheive positive consistent results. This can be accomplished by not only return visits to the facility, but direct distribution efforts established in the community.

Special Agricultural programs:

We recently expanded our service efforts by co-sponsoring a first ever collection program with Farm Bureaus and Agricultural organizations to provide a collection point for the safe treatment and disposal of unwanted, outdated or banned liquid agricultural chemicals. Two pilot programs were recently conducted in the state of California and were very successful.

Costs to the participants were based on container size and were substantially reduced to cover costs of transportation and incineration of the materials only. Sponsors grouped together to contribute staff, equipment and container disposal along with technical personnel to analyze unknown materials that were received. Educational material covering identification to applicable regulations was available to the participants.
The program was a huge success and we hope to provide future programs to other counties. These may include programs for collection of solid chemcials in the future..

Summary

In summary and perhaps most important, we can build awareness of the vital need to handle and dispose of hazardous materials properly. An informed, involved community provides a healthy environment for growth and business opportunities. And that enhances the community image.

Community involvement is key to the success of your program. Many household collection programs have begun with one person and blossomed into a community effort with people working side by side to meet their common need.

Be creative. Utilize whatever resources you have available to you. Contact your solid waste refuse company for suggestions and request their participation.

By utilizing volunteer efforts for local social/civic organizations and local industry, you can save money and reinforce the community relationship.

Involve local business and industry in the education effort. Contact informed professionals who have extensive training in the handling of hazardous waste and collection programs for guidance in the development of your program.

EDUCATE YOUR COMMUNITY ON HOW TO DO IT RIGHT

ANCIENT TRASH, MODERN SOLID WASTES:
AN ARCHAEOLOGIST'S PERSPECTIVE ON LANDFILL DEGRADATION

Douglas C. Wilson
University of Arizona

Introduction

In its most basic sense, archaeology is the examination of material items to reconstruct past human behaviors, human perceptions and ideology. Archaeologists study sites: the structures and deposits which are indicative of the ancient dwellings, neighborhoods, communities, and larger social groups of past societies. Most of the items found on archaeological sites are the discarded materials which remained after the site was abandoned--in essence, refuse. Thus, the majority of data with which the archaeologist works are the broken bits of debris, implements, and wastes which constitute trash and garbage.

The remainder of this paper illustrates how examination our modern society from the archaeologist's unique perspective can shed light on processes of degradation in modern landfills. It is shown how degradation of refuse components after they are deposited in the landfill is probably quite slow. Thus, wastes are largely relegated to indefinite storage when placed in the typical landfill. Greater knowledge on how materials degrade over time and under different environmental conditions is critical before managers and legislators can successfully plan for waste management and reduction in the 21st century.

The Methods of "Modern" Archaeology

How do archaeologists study modern landfill sediments? The Garbage Project has two types of data suitable for looking at solid wastes composition and degradation:

(1) *Fresh Refuse Database*--Information which encodes the composition characteristics recorded from refuse as it was discarded by households, prior to compaction in garbage trucks and deposition in the landfill. For the Fresh Refuse Database, specific sampling and recording procedures are employed. Within each community studied, sample census tracts are selected in a judgmental fashion. In each community, the census tracts together represent the range of selected demographic characteristics (income, ethnicity, household size) present within the overall community and are internally homogeneous with respect to these characteristics. A number of samples comprising a household refuse pickup--all of the refuse put out by an individual household on a pickup day for city collection--are collected from each census tract. Each of these are segregated into 16 material composition categories by student and professional analysts and the weights of each category recorded. The categories include plastics, paper categories--newsprint, packaging and non-packaging paper; and organic categories--yard wastes, food wastes, and wood.

For the long-term study of composition dynamics, refuse from 13 Tucson census tracts between 1978 through the present were analyzed. In addition, six Phoenix census tracts were analyzed for basic recyclable materials characteristics in 1988. Last, refuse from Tucson (over 1,500 refuse samples--1985 through 1988), Phoenix (over 700 refuse samples--1988), New Orleans, Louisiana (over 1,000 refuse samples--1986), and Marin County, California (over 1,000 refuse samples--1986) were examined for traces of hazardous wastes. In this analysis method, when hazardous wastes, such as pesticides, paints, household batteries, and household cleaners are found, they are classified by type and the wastes weighed. These three analyses: long term study, recyclable materials study, and hazardous wastes study form the core of the Garbage Project's monitor of modern refuse. Other analyses are conducted as well, such as a detailed item-by-item analysis of some of the refuse samples.

(2) *Landfill Refuse Database*--Information which encodes the composition characteristics recorded from refuse excavated from landfills located in Tucson, Arizona (Mullins Landfill); San Francisco Bay Area (Durham Road Landfill, Sunnyvale Landfill); Chicago, Illinois (Greene Valley Landfill, Mallard North Landfill), Tempe, Arizona (Rio Salado Landfill), and New York City (Fresh Kills Landfill). Refuse was excavated and analyzed between May 1987 and October 1989 and represented materials laid down in a variety of environments in terms of sediment characteristics, climate, and precipitation and derived from a diverse range of social groups participating in an assortment of consumer and discard behaviors.

The landfill method includes both excavation and analysis. Excavation is performed using mechanized equipment--either trenches made with extended-arm backhoes (maximum depth approximately 30 feet) or wells drilled by bucket augers (approximately 90 feet). Excavation consists of sampling a number of levels from within a number of excavation units. Excavation units are selected in a judgmental fashion within areas stratified by landfill deposit age. This stratification is identified through interviews with landfill personnel and (in the case of the Durham Road landfill) from methane well drilling records. Levels are selected in a judgmental fashion, specifically selecting residential refuse (identifiable in the field based on the types, diversity, and quantities of materials and items). Levels are selected to obtain refuse samples representative of the entire range of dates of deposition in the landfill. Dates are recorded from the ubiquitous newspapers which are present in almost every backhoe or auger bucket of residential refuse. Most newspapers are quite readable, and many have the dates still intact. Refuse samples for detailed composition analysis are collected at approximately ten-foot intervals in depth. Approximately 100 pounds of refuse are shoveled into sample bags from the materials dropped on a wooden sampling platform by the backhoe or auger bucket. Analysis of the landfill samples starts with screening the refuse through a 1/2 inch mesh screen. Materials passing through the screen are designated as "fines". The remainder of the refuse (larger than 1/2 inch in diameter) are segregated into 19 material composition categories and recorded by weight and volume. As in the fresh refuse weight analysis, the material composition categories include plastics categories--flexible plastics, foam plastics, and rigid plastics; paper categories--newsprint, packaging paper, non-packaging paper, corrugated cardboard, and magazines; and organic categories--yard wastes, food wastes, and wood. A number of other analyses are also conducted including moisture content analysis, an item-by-item detailed analysis, and sub-sampling of "fines" and "other" categories.

Biodegradation

As archaeologists, Garbage Project researchers are aware that under certain conditions, items commonly thought of as perishable--usually organic materials, such as wood, paper, or textiles--might last for centuries or even millennia. The best conditions for preservation appear to be either very dry, dark environments or very wet environments. In the first case, there is not enough moisture to permit the survival of bacteria or fungi, the most efficacious decay agents of organic materials and in the second case there is not enough oxygen to permit the survival of aerobic bacteria and fungi, the best of the microbiological decay agents.

For example, complete wooden boats, dating to as far back as 3,300 years ago, have been excavated from saturated lacustrine and oceanic deposits in Israel and Turkey (Wachsman 1988). On the other hand, 8,000 year old mummies have been found in shallow pits in the extremely arid deserts of Chile. Basketry and vegetable materials dating to 5,000 years ago have been found in dry cave deposits in the desert southwest (Navajo Mountain, Arizona, see Irwin-Williams 1979) while the most famous cases of preservation are the 2,000 year old dead sea scrolls found in dry caves near Qumran, Israel. Paper preservation has been noted at historic sites--for examples, 100 year old newspaper has been found in saturated conditions near Philadelphia (Werner Zimmt, personal communication), newspaper and cardboard have been excavated from 1902 municipal refuse deposits in Atlanta, Georgia (South 1988).

While not as ideal an environment for preservation as dry caves or water deposits, landfills also appear to retard degradation. From the Garbage Project excavations at Mallard North landfill in Chicago, a landfill dating to the early 1970s, fifteen year old meat and meat fat were found, still identifiable and still on the bone. Hot dogs were found, perfectly preserved after fifteen years. In nearly all of the excavated deposits from all of the study landfills, even those stretching back to the mid 1960s (Sunnyvale Landfill, Sunnyvale, California) there have been found dates on newsprint which are still quite readable.

An idea of just how slowly materials, in general, are degrading is given in Figures 1 and 2. Figure 1 is based on the refuse sampled from one landfill (43 samples) in Tucson and the fresh refuse samples from one census tract whose refuse was being deposited in that landfill at the same time (271 household refuse samples recorded between 1979 and 1986). The analysis of these units controls for geographic, demographic, and socioeconomic variability. As shown, the two types of refuse are in close accord, indicating that within the past ten years, at least, there has been limited degradation of either plastics or paper.

Figure 2 represents the organic proportions for the Tucson landfill and associated fresh refuse single-census tract samples. As shown, the organic fractions are consistently lower for the landfill samples. This is true regardless of the age of deposit and is probably related to both (1) the rapid degradation of certain organic materials, such as certain food remains and (2) to smaller particle sizes of some of the organic materials--such as grass--which passes through the 1/2 inch mesh screen. All in all, for both the five landfill sample and the Tucson sample, there is little evidence for significant long-term degradation of organic materials (see Figures 1 and 2).

On-going studies of the landfill and fresh refuse databases are examining the components of both organic, paper, and plastic fractions to see what changes may have occurred through time in both generation and degradation characteristics. One conclusion is clear, however. The myth that our landfills are composting our refuse and that all organic wastes will rapidly degrade within decades (or possibly even centuries) is probably inaccurate.

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FIGURE 16.a

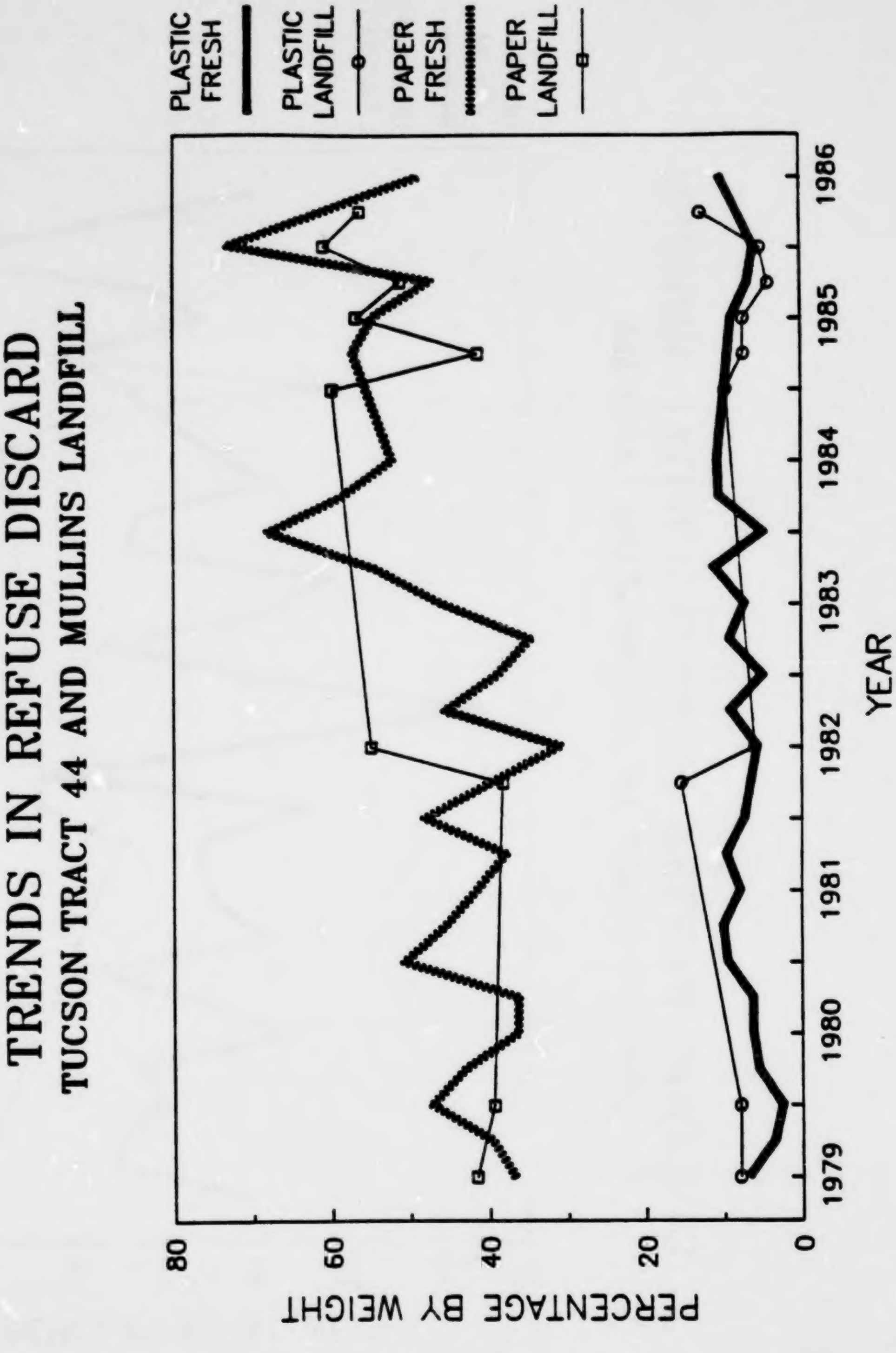
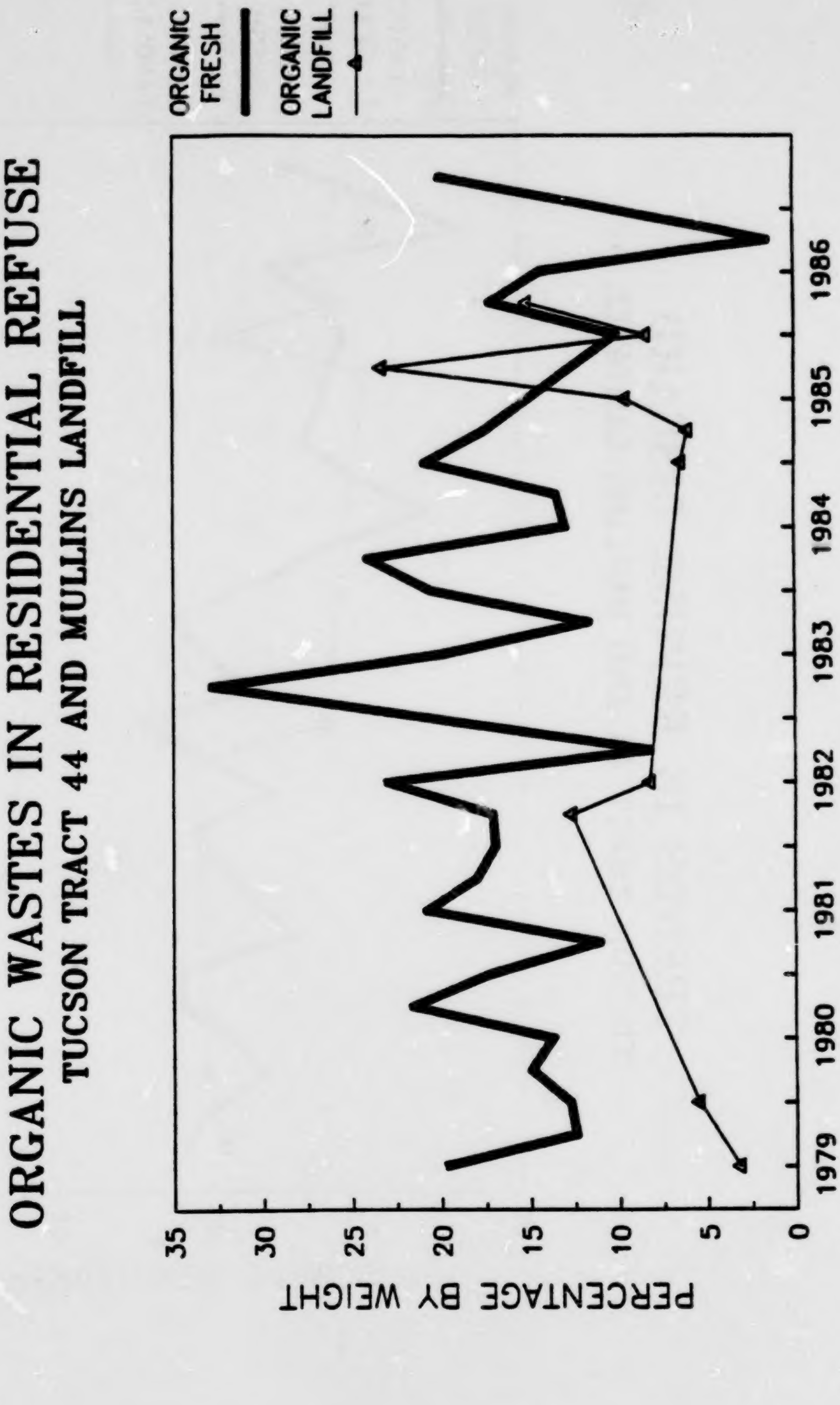

TRENDS IN REFUSE DISCARD
TUCSON TRACT 44 AND MULLINS LANDFILL
PLASTIC FRESH
PLASTIC LANDFILL
PAPER FRESH
PAPER LANDFILL
PERCENTAGE BY WEIGHT
80
60
40
20
0
1979
1980
1981
1982
1983
1984
1985
1986
YEAR

FIGURE 16.b



ORGANIC WASTES IN RESIDENTIAL REFUSE
TUCSON TRACT 44 AND MULLINS LANDFILL

Biodegradation in Landfills

Jim Noble
Tufts University
Center for Environmental Management

In the past few years, legislators -- particularly at the state level -- have made significant moves to manage the content of the municipal solid waste (MSW) stream or to limit what substances may go into landfills. Of particular importance here is legislation that pertains to biodegradability and biodegradable packaging.

Last year, for example, Florida drafted aggressive packaging legislation stipulating that plastic carry-out bags must degrade within 120 days and that plastic-coated paper food packaging must degrade within one year. Yet there is no agreed scientific definition of biodegradation -- nor any standard laboratory test for biodegradability of solids. given this, the legal bases for such legislation often lack scientific support.

Types of Biodegradation

If asked whether biodegradation is "good," most citizens would surely answer, "yes!" Many remember excellent public education about biodegradable liquid detergents in the 1960s or envision a rotting apple core or backyard composting of leaves and grass. The popular conception is that biodegradation somehow reduces many substances to innocuous products.

In modern sanitary landfills, however, biodegradation is quite unlike that of everyday experience. Modern landfill practice dictates that rubbish be buried to control windblown litter, vectors, and odors. Most important, the landfill is covered each day and , finally, capped to keep precipitation out of the garbage, thus preventing the formation of leachate that might contaminate groundwater.

Covering a landfill, however, cuts off the supply of air and sunlight to the rubbish. Within six months or so, decomposition depletes virtually all oxygen in the fill, and all ensuing biodegradation takes place anaerobically. Anaerobic decomposition, carried out by organisms such as methane-producing bacteria that do not require oxygen, is much slower than aerobic decomposition. What's more, the decomposition products are quite different.

Chemistry of Anaerobic Degradation

In the basic biodegradation sequence for carbohydrates -- about 80 percent of the biodegradation material, cellulose degrades through three steps. First, cellulose is hydrolyzed enzymatically to simple sugars, which in turn are rapidly fermented to organic acids, mainly acetic acid. Methanogenic bacteria then consume these acids, producing a gaseous methane and carbon dioxide mixture. The reaction sequence is the same as that for cellulose digestion in cattle and other ruminants.

Several points should be recognized. first, biodegradation requires water. Second, if MSW degrades at all, its degradation products form either an acidic leachate or landfill gas. The theoretical maximum for gas production could be about 180 liter/kilogram of MSW, or 1000 standard cubic feet/ton.

Many landfills, however, have capacities that exceed millions of tons and can produce correspondingly large amounts of methane. In Puente Hills landfill in Los Angles, a 65-megawatt steam turbine electrical power generator is testimony to the large volumes of methane that form in landfills.

Landfills and Public Health

What are the public health consequences of landfill biodegradation? No one knows for sure. Leachate, of course, is the main actor in groundwater contamination by landfills. In the early stages of landfill biodegradation, the organic content of leachate is quite high. These organics include degradation products and trace amounts of toxic species (EPA) priority pollutants). The acidity of leachates also enables them to extract heavy metals from MSW -- notably lead and cadmium.

EPA laboratories in Research Triangle Park (NC) and California's South coast Air Quality Management District are studying the public health consequences of landfill gas. The gas contains trace amounts of EPA priority pollutants, which vaporize from the original MSW. A recognized explosion hazard, landfill gas also has been known to migrate laterally into nearby houses. In many cases, however, existing gas collection technology can solve many of these problems.

Mummified MSW (Will the mummy walk?)

An emerging body of experimental data shows that modern landfills are, in reality, nothing more than garbage storage areas. In particular, sanitary landfill moisture appears to be the single most important environmental variable affecting biodegradation rates. In some capped landfills, 30-year-old newspapers are completely legible and can be used to date MSW. Moisture content in landfills is obviously also a function of local climate and weather.

Most modern landfills are intentionally kept dry to minimize leachate formation. The result? MSW degrades slowly, if at all.

To learn just how quickly degradation takes place, Tufts University's Center for Environmental Management is conducting a research program on the basic physics, chemistry, and microbiology of landfills. This research seeks, among other things, to accelerate biodegradation and predict the longterm biological activity of landfills.

There is -- potentially -- an ominous side to capping landfills. Once a landfill is closed and capped, landfill operators are usually required to maintain cap integrity for some time, often 25 years. After this, however, environmental liability and monitoring responsibilities are unclear and vary from state to state. In most cases, the current property owner appears to bear the major liabilities. Should the cap integrity be compromised if the landfill were to settle or be invaded by tree roots, moisture could easily enter the landfill. In fact, given what we know of solids, plants, and water, this is inevitable. Once water enters the landfill, biodegradation, gas formation, and leachate generation could begin -- without monitoring.

Laboratory work suggests that this is a serious concern. Once moistened and slightly warmed, samples of dry MSW from landfill exhibit greatly enhanced gas production as their dormant biological activity revives. Since the same scenario could easily take place in the field, our current sanitary landfill management policies may only postpone the environmental downside for 25 years.

Future Options

Today, plastics and other synthetics represent only about 7 percent of the MSW stream by weight (12-14 percent by volume) -- half of the oft-quoted media statistic of 30 percent by volume. Unless the plastics component of the waste stream grows greatly, carbohydrates -- paper, garden wastes, and the like -- form the greatest substrate for biodegradation in landfills. While news accounts often quote 200 years as a degradation time for plastics in landfills, it's probably more reasonable to think of plastics as inert materials, much as we do glass bottles.

We consider carbohydrates to be the problem in landfills. Not only are they the largest single chemical constituent -- about 65 percent, but their degradation products are not necessarily benign. That is, when carbohydrates break down, they form both an acidic leachate, which can extract toxic materials from the garbage, and methane, which can be an explosion hazard and a contributor to greenhouse warming.

The best solution may be to accelerate and complete the biodegradation of carbohydrates in a controlled way, and generate methane for fuel. The approach will also extend a landfill's useful life. If we decide to take this path, landfills of the future may well involve more front-end processing technology to permit more recycling. The landfill itself could be large bioreactor operated to enhance degradation and gas formation. Biodegradation would essentially finish within the post-closure period.

How do biodegradable plastics fit into this picture? So far, there is no compelling scientific argument for developing them. While there is nearly unanimous approval for some bio- and photodegradable plastics as a way to limit surface litter, such materials are unlikely to ease the space squeeze in anaerobic landfills.

ABSTRACT

DETECTION OF LANDFILL CONTAMINANTS BY FIELD SCREENING METHODS

by

John D. Koutsandreas(1) and Thomas L. Baugh(2)
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the (2)U.S. Environmental Protection Agency

Field screening is the use of rapid, low-cost test methods to determine whether a characteristic of interest is present or absent, above or below a predetermined threshold at a given site, or at a concentration within a predetermined range of interest. Field screening methods have been used at hazardous waste sites for the past eight to ten years. These methods addressed the detection of qualitative differences in chemical concentrations rather than quantitative data for rigorous decisions. The transition in the use of field methods for gathering qualitative data and some quantitative data is under way. Because the data are being used to make more demanding decisions, one must be much more careful in use of the methods. Choice of method is driven by the requirements of the decisions that the data will support. This concept, called the data quality objective (DQO) has made it possible to use many types of data for hazardous waste site investigations. It is important that the data are used to support the kind of decision for which they were gathered.

There are a number of field screening tools available. A major concern is the appropriate use of these tools and the need for protocol development so that they will be used consistently. There are also a number of emerging technologies which are not yet commercially available but which offer advancements in capability to provide on-site screening data of contaminants.

Presently, field screening techniques are rountinely being used throughout the Superfund Program. However, because of the decentralized nature of the program, knowledge and skills gained at one site are not necessarily transferred to others. Appropriate field screening methods would provide accurate and timely information to personnel involved in site sampling.

The field screening methods include gas chromatognphy, X-ray fluorescence spectrometry, and soil gas sampling equipment. Methods that are being improved include mass spectrometers and gas chromotograph/mass spectrometers. Among the newer methods are fiber optic sensors, chemical microsensors, ion mobility spectrometery, surface enhanced Raman spectrometery, and others.

For presentation at the Conference on Household Hazardous Waste Management, Nov. 6-8, 1989, Orlando, Florida.

HAZARDOUS WASTE SITE INVESTIGATIONS

FIELD SCREENING

- USES RAPID, LOW-COST TEST METHODS TO DETERMINE WHETHER A CHARACTERISTIC OF INTEREST IS PRESENT OR ABSENT, ABOVE OR BELOW A PREDETERMINED THRESHOLD AT A GIVEN SITE, OR IN A CONCENTRATION WITHIN A PREDETERMINED RANGE OF INTEREST

- ALLOWS PRIORITIES TO BE SET

FIELD-SCREENING SYSTEMS

DESIRABLE CHARACTERISTICS

- SENSITIVE
- SPECIFIC
- USER-FRIENDLY
- REAL-TIME CAPABILITY
- BROAD RANGE OF SAMPLES
  GASES, LIQUIDS, SOLIDS
- RUGGED
- SMALL IN SIZE
- LIGHTWEIGHT
- LOW IN COST
- RELIABLE

DATA QUALITY OBJECTIVES

STATEMENTS OF THE LEVEL OF UNCERTAINTY A DECISION MAKER IS WILLING TO ACCEPT IN RESULTS DERIVED FROM ENVIRONMENTAL DATA

MANAGEMENT AND CONTROL

FIELD SCREENING ISSUES

- WHERE TO SAMPLE
- IS THE SAMPLE REPRESENTATIVE
- MAINTAINING SAMPLE INTEGRITY

FIELD-SCREENING DEVICES/KITS

- FIBER OPTIC SENSORS
- PIEZOELECTRIC SENSORS
- BIOMETHOD INSTRUMENTS/KITS
- GAS CHROMATOGRAPHS
- MASS SPECTROMETERS
- GAS CHROMATOGRAPHS/MASS SPECTROMETERS
- ION MOBILITY SPECTROMETERS
- X-RAY FLUORESCENCE SPECTROMETERS
- SAMPLING AND ANALYSIS EQUIPMENT FOR SOIL-GASES AND AIR
- CHEMICAL KITS FOR SOILS

HAZARDOUS WASTE SITE CONTAMINANTS

EXAMPLES OF ORGANICS

- BENZENE
- TOLUENE
- METHYLENE CHLORIDE
- CHLOROBENZENE
- DICHLOROETHANES
- DICHLOROETHENES
- ETHYLBENZENE
- PHENOL
- TRICHLOROETHANES
- TRICHLOROETHENE
- XYLENES
- DICHLOROBENZENE
- NAPHTHALENE
- VINYL CHLORIDE
- PCB'S
- ACETONE

FIELD-SCREENING METHODS CATALOG - USER'S GUIDE

EPA 540/2-88/005
NTIS PB89-134-159 $21.95

- 31 CURRENTLY USED FIELD METHODS
- LIST OF SITES WHERE THE METHODS HAVE BEEN USED
- TECHNICAL POINTS-OF-CONTACT LISTED TO PROVIDE USER SUPPORT

INTERNATIONAL SYMPOSIA

FIELD SCREENING METHODS FOR HAZARDOUS WASTE SITE INVESTIGATIONS

OCTOBER 1988
FEBRUARY 1991

FUNDING AND COSTS

Submitted by: Gina Purin Norcal Solid Waste Systems, Inc

Projecting Costs

- Very Difficult - Many variables involved
- # households / com x 1% x .40 drums = # drums x $350 (or average drum cost)*
- Past projects (expect increase in participation)
- Ideas from experienced contractors and RFP's

---

* Formula is a ballpark estimate for projecting the total costs that may be associated with a program. Actual program costs may vary to a great extent.

Comparing Total Costs

- Some programs include staff time, others don't
- Some include publicity, others don't
- Etc.
- Look at exact line items

Actual Program Costs Can Vary

- Amount of Material Collected
- Type of material collected
  - City of Santa Clara paid $225/drum for poisons and $575/drum for aerosols with an original quote of $720
- Distance to a TSD
- Who the contractor/hauler is
  - Some are more expensive; others have prices that fluctuate wildly

Sanitary Fill Company*

Transport Costs for 1 Shipment (Same Hauler, Same Destination, Same Distance)

1/89	$1,116
2/89	$ 577
4/89	$ 799
6/89	$2,056

* All Contractors used by Sanitary Fill company for the treatment , disposal and hauling of hazardous waste are selected by the City of San Francisco through a request for proposal. Sanitary Fill has no authority to negotiate lower rates for these services with other contractors.

Sanitary Fill Company

Oil Paint Sent for Fuel Blending(Just what the treatment facility charged)

1988(every mo.)	$95/drum
1/89	$197
2/89	$294
5/89	$202
7/89	$300

Viewing Costs

- per hshlds in service area
- per participant
- per drum
- per capita
- per person reached by the advertising media
- per person sent info
- per persons calling for info
- etc.

Palo Alto 7/89

- cost: $44,855
- cost/drum (166) = $270
- cost/participant (463) = $97
- cost hshhld (23,600) = $1.90 ($.16/mo)

Reducing Costs

- reuse of waste exchange
- recover (fuel blending)
- consolidate
- recycle

- Economy of Scale
  - plan regional efforts, milk runs, etc. to contain costs (esp. transportation)

- Phone Appointments
  - can offer other disposal avenues thus reducing waste brought to site
  - assure only "acceptable" waste will be brought in

- "Recycle Only" days
  - doesn't address real problem wastes
  - handles things like latex paint, used oil, antifreeze, batteries, etc.

- Train Existing Staff for Specific Tasks
  - using comparable line items, the cost to the city of San Francisco for bulking one 55-gallon drum of flammable solvent is $390 if Sanitary Fill (operator does it . $799 for an outside contractor to do it.

- Use Volunteers
- Reconditioned Drums Less Costly
- Donations
- No Empties

- Educate
  - Tell people NOT to bring in materials that can be managed in another way; encourage use of safer substitute

- How Reuse saves dollars
  - reuse is giving away or encouraging the giveaway of products according to set guidelines: e.g. only products that are in good shape, have labels in tact, and are currently available for over- the - counter purchase

VALLEJO

1989 Collection Day
Gave away over 350 products
Cost Savings: @$3,000
110 lbs. pool chlorine - city parks & rec

How Consolidation Saves Dollars

Ventura Regional Sanitation District
Acids/Bases for Neutralization into POTW

12 labpacks = $5160 ($430/drum)
2 consolidated Drums = $860 ($430/drum)
Cost Savings = $4300

Pesticides for Incineration

21 labpacks = $9030 ($430/drum)
4 consolidated drums = $1720 ($430/drum)
Cost Savings $7310

How Recycling & Recovery Saves Dollars

Sanitary Fill Company
Water Base Paint (55 gal/drum)

Recycle	$110 (w/transp)
Recover (Fuel Blending)	$300 (w/o trnsp)
Incineration (Destruction)	$600 (w/o trnsp)

Funding Programs

- 2448 monies
  - CA only; local agencies
- Tipping Fees
- Utility Bills
  - garbage, electric, water, sewer, combo
- Adopt-A Barrel
- Place conditions on siting of TSDs
- State Superfund
- Special Assessments on land
- General Funds
- Special Funds
  - HazWaste bond from violators or a Water Quality Trust Fund
- Retailer Permit Fee
  - Retailers in Iowa that sell HHW must pay a permit fee of $25

- User fee
  - Larimer Co., Colorado charged $10/lb for HHW; 6 participants in 5 months no fee now
- Product Fee
  - first in-state possessor of certain haz substances in WA must pay a tax; ALL pesticides are taxed regardless of toxicity; about 700 chemicals in CERCLA are listed
  - Product fee is equitable; has advantage of making those who use hazardous materials be responsible for their safe management(including safe disposal and treatment)

Cost of Periodic vs Permanent Programs

- Can't really say
- Can say less waste is generated for actual disposal

	Santa Monica
1-day event (1985)	.37 drums/participant
1-day event (1986)	.84 drums/participant
Permanent Program*	.17 drums/participant

*Reduces drum count per participant by allowing more time to find alternative methods for managing the waste.

Cost of Drop-Off vs Pick-Up

San Diego, 1988 - 1989 Program

Drop-off cost / participant	$79.13
Pick-up cost / participant	$207.17

Los Angeles - 1989

Drop-off cost / participant	$180
Pick-up cost / participant	$456

COLLECTION PROGRAM LIABILITY

James Dougherty, Chief of the National Projects Branch in the Office of Enforcement and Compliance Monitoring, U.S. EPA, Washington, D.C.

Views expressed in this presentation do not necessarily represent the official position of EPA. Under the federal RCRA Subtitle C regulations, HHW is exempt from regulation unless it is mixed with regulated hazardous waste of any quantity.

HHW is not exempt from CERCLA liability. CERCLA imposes strict joint and several liability upon hazardous waste generators. This means that a generator can be held liable for part or all of the cost of a hazardous waste cleanup, regardless of the relative amount of waste contributed by the generator, and regardless of whether or not the generator was negligent.

HHW collection organizers should not be overly concerned about CERCLA liability. This is because:

1) The owner/operators of licensed TSD facilities that receive HHW are generally large, insured companies which are required under RCRA to correct and clean up any releases to the environment, thus relieving generators of liability.

2) If EPA was to recover cleanup costs from hazardous waste generators, the bulk of the costs would be borne by the largest generators. Household waste collections would be regarded as "de minimis" quantities, thus communities would only be apportioned a small percentage of the costs (probably not more than $2500), and could not be charged again if the initial site cleanup was later deemed inadequate and in need of further corrective measures.

3) Communities are liable for HHW generation whether the waste is disposed of at a licensed hazardous waste facility, a municipal landfill, the sewer system, or any other outlet. Therefore, towns that succeed at directing HHW away from landfills or other facilities not licensed to receive hazardous waste may actually reduce their net liability. This is because HHW received by collection programs is managed at facilities designed with safeguards that are intended to minimize the probability of a release of hazardous waste to the environment.

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by LeeAnn Merashoff

RFP: Contracts

Dana has asked me to speak about two types of RFP's: Contracts; those for one day programs; those for permanent programs. Since we have a limited time to discuss these, we'll go over some common elements of both, and important specifics of each type individually. RFP's: contracts should go hand in hand because a good RFP should obtain the service you really want. A good contract should clearly spell out the responsibilities of both parties in making sure those services are provided. There are some guidelines that apply to both types of RFP's; those for one days and permanents, and we'll discuss those first.

The purpose of an RFP is to make sure that you will receive a description of as well as costs for the services you really want. This is something easier said than done. In having responded to hundreds of RFP's, I hope to share with you some suggestions on how not to get "see attached" typed all over your RFP when you receive it in the mail. Most often "see attached" means either what you are asking for is not clear or not really available. Do not take for granted that a potential contractor knows your priorities or your goals. You need to spell these out.

The best way to do this is to prepare a background statement or description of the project. This, I think is an important element of an RFP that is often missed. This background statement or description should include the following:

> Describe what type of planning or other work you have already done, for example; "The city or county of .... will handle waste oil and batteries via alternate means. "Co workers will be responsible for the following ..."

The less information a contractor has to assume, the more specific and accurate the proposal will be. Include as much detail about the project as you can, including budget available. A lot of people are hesitant to list the funds available, but there is such a strong relationship to the funds available and the size of the collection that it makes a big difference in the amount of labor and supplies the company is planning. It is also important that he provides you with a price estimate.

Describe any special concerns or goals. Is staying within a specific budget a priority or is handling a certain number of participants more the priority? Is a special waste type of partial concern such as paints, batteries or oils? Are you looking for options on these? Don't assume that a contractor will list all available options for handling different types of wastes if you don't ask for options. Clarify in the background station or description of any special qualifications or considerations required for bidding. Find out and include any restrictions of your purchasing department or legal department.

Does your legal department have a contract form that must be used? If so, include a copy and let the contractor know they may be required to use that form. It is a good idea to have the legal department review the RFP and potential contractors as soon as possible to ferret out input issues that may cause hold ups. It is wise to complete this well before the week you are trying to get the contract signed.

Other issues or special qualifications include; Contractors insurance requirements, bid bond, or performance bond requirements, as well as equal opportunity or small business requirements.

The topics we have just mentioned apply to both permanent and one day collections. Now let's look at items specifically different in each one. The bid specifications for a one day collection program, and consequently the elements of the contract, are more specific and itemized that those that would apply to a more permanent program. Your RFP for a one day usually does ask that the contractor function as the generator, and therefore assumes that compliance responsibilities will be performed by him.

The one-day RFP will ask for a description and number of personnel, types of equipment that will be on site and a description of work procedures or a work plan. The RFP should ask for a description of how a site emergency would be handled, and how site problems such as problem waste, unknown waste, weather problems and traffic problems will be handled. The RFP should ask for a description of how each predominant waste type will be handled - i.e. what size containers will be used, what will and be consolidated, what types of materials will go into a solid waste disposal container.

Solid Waste has become a more and important issue. You as organizers, need to be able to plan the disposal of solid waste that is generated from these events. For example, if latex paint is not to be accepted and some is discarded into the solid waste container, will this paint be a problem for the solid waste disposal site?

The RFP should ask for a list of waste types that will be accepted as well as those that will not be accepted. Ask for references of similar projects - recent projects preferably.

Cost Components

Ask for a listing of all costs for providing the required services, including a breakdown of the various cost components. The cost components should include the following:

- Mobilization of set up costs to service parts according to your plan. These costs are for labor and equipment. If you have not yet decided between same options - say - receive 2 lines of cars -vs- 4 lines of cars, ask for a cost for either way.

- Ask for a unit price per drum or other container for different waste types collected. Here it might be best to allow the contractors to list their categories and prices. There are various ways of categorizing the waste types.

- If you have an option of handling a waste stream alternatively, you might want to ask for a cost for that anyway in case you need the information as a back up.

- Ask for any additional costs that may arise - will there be any charges for extending the site hours if necessary - Will there be any additional costs or unit costs for special equipment if needed - such as overpacks, SCBA units, spill equipment.

One good way to list costs is to have three items lists on the cost schedule sheet, one for the set up costs, a second for the unit prices for waste, (type of waste and drum volume) and the third for any other potential charges that may occur.

This should cover all applicable costs and yet allow the contractor the flexibility to list all the items he may have which might be unique to his company.

In switching over to the development of an RFP for a permanent program, there are a few important and fundamental issues in the RFP for a permanent site.

The first and most important issue that will govern the rest of the RFP and contract for a permanent site is that of management options. The primary options are that of full service management by a contractor, partial management by a contractor, and waste transporters and disposal only by contractors.

List what service and options you think you may want the contractor to provide, options such as:

- Generator Status
- Overall managing/consulting fees - will there be a monthly fee for managing required paperwork?
- Staffing - this is an issue of concern? What do they want to continue to provide?
- Training program for the staff - What does the training include and what does it cost?
- Chemists for receiving the waste or for receiving and packaging the waste. Ask for an daily, monthly, or yearly cost.
- Facility inspection - do you expect the contractor to maintain the physical site and do complete inspections?
- Who is responsible for an emergency situation and how much will it cost?
- What supplies will the contractor provide - both for initial set up of the site, as well as monthly supplies?
- What will be the frequency of waste pick ups and the cost for

these? What will the cost of emergency pick up be - how much notice does the contractor require?

- What is the availability of the contractor to respond and deal with problems such as abandoned wastes or leaking drums?.
- What types of wastes will the contractor handle and what are the unit costs for these wastes?

Here your receive a larger and more detailed list of prices. You may even , at this point, think it is impossible to compare prices. However, with a permanent program, you have the capacity to do more consolidation and to handle a wider variety of wastes since you can store it while your investigating the most effective management option for the waste.

What are the projected cost changes from year to year? Set up some time increment- such as quarterly, semi annually, or annually when you would want a report on services rendered and costs to date. A good RFP should reflect good planning. If you're having a really hard time writing an RFP, you may have to stop and do some additional planning in that issue. Which is a good reason to allow ample time to prepare, send out, and receive back an RFP.

A good contractor should accurately set forth the responsibilities of each party involved. He should spell out the significant issues that were formed in planning, described in the RFP, and ultimately accepted in the proposal.

(*For a sample RFP please see Appendix XI)

HEAVY METALS IN MUNICIPAL SOLID WASTE: OVERVIEW PRESENTATION

David Kleckner
Dana Duxbury & Associates
U.S. EPA HHWM IV Conference
Orlando, Florida
November 6-8, 1989

I am going to provide a brief overview of heavy metals in the waste stream, approaches for addressing heavy metals in municipal solid waste (MSW), and will discuss advantages and limitations of these approaches.

Heavy metals in MSW come from a wide variety of sources. Today's speakers will focus on batteries and fluorescent tubes as sources of heavy metals.

There are approximately 70 million lead-acid batteries (e.g., automotive) sold in the U.S. each year. According to EPA, lead-acid batteries are the largest source of lead in the MSW stream.

There is approximately a $2 billion annual household battery market in the U.S. Household batteries include mercury and silver oxide, nickel-cadmium, lithium, alkaline and carbon-zinc batteries. Alkaline and carbon-zinc batteries make up the largest percentage of the consumer battery market. Nickel-cadmium batteries have been identified by EPA to be the largest source of cadmium in MSW.

Fluorescent tubes in the waste stream have been a concern because of they contain mercury. Currently, approximately 80 percent of the fluorescent tubes in the U.S. are consumed by commercial markets.

Although the heavy metals in batteries and fluorescent tubes are associated with human health hazards, there is no consensus on the degree of risk these products pose when disposed in MSW compared to when they are collected and recycled or disposed of as hazardous waste. For example, Swedish studies led the Swedish government to conclude that mercury in batteries pose a threat to the public when burned in municipal incinerators. As a result of its studies, Sweden instituted a national voluntary program to collect and separate batteries from MSW.

The National Electrical Manufacturers' Association (NEMA) is not convinced of the risks, however, and point to U.S. and European studies indicating household batteries do not pose a threat to public health. Furthermore, NEMA is concerned that collection and storage of batteries can pose risks if they are ingested or stored without sufficient ventilation.

Given the uncertainties regarding risks, concerns about heavy metals in MSW have led policy makers, industry, and activists to consider a variety of approaches. These approaches include: studies; public education; source reduction; collection; and bans.

Studies

The purpose of some studies is to identify sources of heavy metals in MSW, assess the risks, and evaluate recycling and other management options. Arthur D. Little, Inc. recently completed a study for the state of New Jersey to assess markets for recycling household and lead-acid batteries; the Minnesota Pollution Control Agency is studying the feasibility of collecting batteries, the batteries to target for collection, and the potential for developing recycling in the state; EPA is studying sources of mercury in MSW, as well as substitutes for lead and cadmium in consumer products; Bronx 2000 in New York plans to study the heavy metal content of batteries and the feasibility of expanding recycling opportunities, and hopes to sponsor pilot demonstration projects to evaluate household battery recycling technologies.

Studies are important for ensuring that we "look before we leap" and not adopt management plans before the problems and potential solutions are adequately evaluated. The limitations are that studies are not always catalysts for action, and can result in battles between experts representing competing interests, causing stalemates and delaying program implementation.

Source Reduction

Source reduction results from producing and consuming products with less heavy metal content or with a longer useful life. Industries have undertaken some voluntary source reduction initiatives. For example, the Polaroid Corporation responded to strict requirements in Sweden by developing a mercury-free battery which is now marketed in the U.S.

Other companies (e.g., Phillips) are also marketing mercury-free batteries in Europe in response to regulatory pressure but not in the United States. According to a staff member of the Environmental Action Coalition of New York City, the mercury-free batteries sold in Europe have a slightly shorter life-span than mercury batteries. Therefore, companies are not marketing them in the U.S. because they fear they will suffer a competitive disadvantage. This information indicates that federal regulations limiting or banning mercury from batteries sold in the U.S. might be needed to achieve source reduction of mercury in household batteries in this country.

Source reduction is valuable as a means for reducing hazards, however, it can require significant R&D and capital investment to develop and implement product or process changes, and depends upon the ability to find less toxic substitutes to use in products demanded by consumers.

Public Education

Public education efforts can include product or shelf-labeling, or provision of informational materials to inform the public about the products containing heavy metals and best management options. Programs such as the University of S.W. Missouri HHW Project provide such information. While public education is certainly important for ensuring that people are not casual about their use and disposal of products containing heavy metals, these efforts do not ensure that source reduction will occur, or that viable recycling markets will be developed and be accessible to the public.

Collection

Programs have been developed to collect products containing heavy metals for recycling or disposal as hazardous waste. Lead-acid batteries have been collected at HHW collections and through solid waste recycling programs. According to the Secondary Lead Smelters Association, approximately 80 percent of lead-acid batteries are recycled. During the past few years the recycling rate was dropping due to depressed lead prices, and it was estimated by Arthur D. Little, Inc. that as little as 65 percent of the batteries were getting recycled. Recycling of lead-acid batteries has rebounded during the past year, and may be back to the 80 percent level, according to Arthur D. Little.

Communities have set up programs for collecting household batteries as Marie Steinwachs will discuss in her presentation during the next session. For example, Hennepin County, MN will begin collecting mercury and silver oxide batteries to be recycled by the Mercury Refining Company in Latham, NY. The NH/VT Solid Waste Project has been collecting household batteries by getting retail stores to voluntarily place buckets in their stores for collecting batteries.

Mercury and silver oxide batteries can and have been recycled in the U.S. The Mercury Refining Company recycles these batteries. Markets have not been established for recycling other types of household batteries in this country. Recycling of nickel-cadmium batteries is complicated by the fact that these batteries are often built into products, thus are difficult to remove (the battery and product manufacturers have been meeting to try to begin to resolve this problem). Due to lack of recycling markets, communities collecting household batteries are often forced to manage the batteries as hazardous waste.

Fluorescent tubes can be collected and processed to recover Mercury. Mercury Refining Company has accepted fluorescent tubes for recycling, but it is an expensive process ($1200 per 55-gallon drum), and thus far the company has been servicing commercial clients. In California, there are warehouses full of collected fluorescent tubes that are being stored until they can be recycled. There have been recent efforts to establish a recycling facility in California.

While voluntary collection and deposit programs can help to keep heavy metals out of the MSW stream, it is important to recognize the limited markets for many of the household products that contain heavy metals, as well as risks associated with current recycling processes.

Bans

A more drastic approach to voluntary collection and deposit programs is to ban batteries, fluorescent tubes, or other heavy metal sources from landfills and incinerators; or to ban or restrict the use heavy metals in specific products. It was noted by the keynote speaker that new legislative proposals include a national ban of lead-acid batteries from municipal incinerators.

Banning products from municipal landfills and incinerators could help to divert batteries from the MSW stream, however, this would not ensure that these products are recycled, and could be difficult or costly to enforce.

Conclusions

Those who are concerned about batteries, fluorescent tubes and other sources of heavy metals in the MSW stream can be expected to pursue some or all of the management options I discussed. It is cautioned that while collection of batteries or fluorescent tubes at HHW collections or recycling centers may be part of the solution, communities should be sure to assess local markets for recycling and the credibility of the processor.

Collection does not by itself ensure that the collected materials will be recycled in a safe, environmentally sound manner, or that pollution prevention/risk reduction goals will be met. For the time being, communities may conclude that managing collected household batteries and fluorescent tubes as hazardous waste is their best management option. In the meantime, efforts are needed on the part of government, industry and environmental organizations to evaluate risks, assess and promote source reduction opportunities, and to work to develop environmentally sound, economically viable recycling technologies.

SOURCES AND FATE OF HEAVY METALS IN MSW LANDFILLS: LEAD, ZINC, CADMIUM, AND MERCURY

by

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Introduction

There is a wide range of consumer products and packaging disposed of in municipal solid wastes, down sewers, into septic systems, and elsewhere. Many of these materials contain hazardous substances as constituents and some contain heavy metals. This paper addresses four heavy metals--lead, zinc, cadmium, and mercury--which are found in certain household products, some of which have been targeted as household hazardous wastes and some of which have not. The sources of these wastes are quite varied and the fate of these metals in the landfill is a very complex problem. On the basis of research conducted by the University of Arizona's Garbage Project, an initial, preliminary discussion of the relationships between household items containing heavy metals and the migration of these metals in landfills is undertaken. It is suggested that levels of lead, zinc, cadmium, and mercury in one landfill's sediments are considerably higher than levels of these metals in soils and other natural sediments. Further, certain specific sources--batteries, electronics, and appliances--do not appear to directly influence the levels of metals identified in the landfill sediments studied. Finally, on the basis of one incinerated deposit, concentrations of certain metals appear to be elevated. It is stressed that patterns identified from this one landfill may not be characteristic of sediments in other landfills or under other conditions.

The Metals Issue

There are currently a number of important concerns surrounding the use and disposal of wastes containing heavy metals. These issues require quantitative data on metals for a wide range of waste streams, especially those of residential solid wastes and the municipal landfill. Many heavy metals are currently regulated by the Environmental Protection Agency (EPA). Materials containing lead, zinc, cadmium, and mercury are considered a hazardous waste under the Resource Conservation and Recovery Act (RCRA) (1) if the waste exhibits characteristics of EP toxicity over the allowable limits for the metal or (2) if a certain metal containing by-product is listed in the Code of Federal Regulations (Chapter 40, Part 261). The toxicity of metal and the potential for heavy-metal exposure are currently issues with important ramifications for homeowners, manufacturers and recyclers. While many metal-bearing materials are recyclable, problems in old recycling techniques and new legislation have, to some extent, impeded this form of waste reduction. For example, many lead-acid battery recyclers who can now be held liable in the transport and discard of these batteries as hazardous wastes, have ceased their lead-recycling efforts

(Steinwurtzel 1988). A lead- and zinc-bearing, recyclable material--waste oil--will potentially suffer a similar fate if legislated as a hazardous waste (Mike Henley, "Viability of oil recycling seen hinging on label" April 24, 1989: WasteTech News 1(17)).

Sources of Heavy Metals in Household Refuse

There is a wide range of commercial products and packaging that contain heavy metals. While some of these, such as household and auto batteries, have usually been singled out as household hazardous wastes, certain other, less specific sources, such as newsprint and tin cans, have usually not. A review of the sources of lead, zinc, cadmium, and mercury in household products is a useful starting point for the discussion of heavy metals in residential refuse.

Lead. Modern products containing lead include lead-acid (automobile) batteries, motor oil and oil filters, lead solder on light bulbs and circuit boards, leaded glass in glass to metal seals on light bulbs, auto wheel weights; lead wraps around the more expensive bottles of wine, newspapers, magazines, books, and packaging paper inks; and PVC plastics (Rugg 1988, Franklin 1989). In addition, certain ferrous "tin" cans still utilize lead solder on the primary seam (see below). While lead-acid batteries and used oil are notably recyclable (see discussion above, however), the other sources are both ubiquitous and non-recyclable.

Zinc. Zinc is found primarily in household (dry-cell) batteries and lubricating oil (Gurnam and Associates 1979, Franklin Associates 1988:F-3 to F-5).

Cadmium. Sources of Cadmium in MSW are household batteries (especially nickel-cadmium batteries); plastics (as a stabilizer in PVC plastics or as a constituent of pigments); consumer electronics and appliances; newsprint, magazines, and other items associated with printing inks; pigments in, glazes on, or as a phosphor in glass and ceramics; rubber products; and used oil (Rugg 1988, Franklin Associates 1989:5-8).

Mercury. Mercury is most commonly associated with household dry-cell batteries (usually the mercury "button" variety) (Franklin Associates 1988:F-3 to F-5, Hershkowitz 1988). Analyses of Garbage Project data can identify the relative importance in residential solid wastes of some of these heavy metal-bearing materials.

Lead-acid storage batteries

The Garbage Project has studied a total of 65.8 tons of residential refuse as part of its studies of household hazardous wastes. Wastes have been collected in New Orleans, Louisiana; Marin County, California; Tucson, Arizona; and Phoenix, Arizona. It is important to note that results of these studies do not reflect self-haul wastes (refuse brought in by individuals to the landfill) or refuse from apartment complex dumpsters. From the 65.8 tons of refuse, analysts collected a total of *two* lead-acid batteries that, together, weighed 82.9 pounds (both were found in Phoenix, Arizona samples). The extremely low number of auto batteries found suggests that lead-acid battery discard cannot be predicted based on our sizeable refuse sample. Based on these findings, however, lead-acid auto batteries are likely less than one tenth of one percent of household refuse by weight. These results are contrary to recent findings by Franklin Associates (1989:19) that suggest that lead-acid batteries are the primary source of lead in municipal solid wastes. Why the discrepancy? One reason may be that lead-acid batteries, while representing a high concentration of lead per battery, are not discarded very frequently compared to other household refuse items. The implications of this are that while most lead-bearing products are more homogeneously distributed within a landfill, lead-acid batteries may not. This distribution factor may affect the attenuation/migration behavior of the lead. For example, particular zones within the landfill may be more amenable to lead migration (due to Ph, temperature, moisture content, etc.). Heavy metals from lead-acid batteries, because the metals are localized (not dispersed), may not be the most likely to migrate. Other, more dispersed metals may have a greater migration potential.

Another factor is that lead-acid batteries are discarded into other waste streams than the one's the Garbage Project analyzed. In addition to self-haul and dumpster refuse, there are two other likely ways in which lead-acid batteries are discarded but do not end up in the residential waste stream. First, used batteries may be abandoned, either in the cars in which they were used or in illegal dump sites. Second, homeowners may place the batteries into indefinite storage in garages, on shelves, or in the backyard. Archaeologists term this storage of potentially useful or recyclable items as "provisional refuse" (Deal 1983).

Light Bulbs, Electronics and Appliances

Rugg (1988:12) suggests that "the most frequent contributor of lead solder to MSW may be the light bulb." Light bulbs have both lead solder and solder-glass on the glass to metal seal. In addition, lead solder is used in circuit boards on most electrical appliances. Franklin Associates (1989:56-61) suggests that lead associated with electrical appliances, especially the glass associated with television sets is a major source of the lead in MSW. Cadmium plating was used in certain appliances (dishwashers and washing machines) and consumer electronics in the past decade but largely these products no longer contain appreciable amounts of cadmium (Franklin Associates 1989:144).

The Garbage Project's Spring of 1988 detailed analysis of refuse from 53 sample household refuse pickups--all of the refuse put out by a household on a pickup day for collection--were examined to characterize specific metals-bearing items of interest including light bulbs, electrical appliances, and ferrous "tin" cans (see below). The refuse was sampled and hand-sorted by student volunteers. From these 53 refuse pickups, 6,529 individual items from 2,682 discrete observations were recorded from February to May of 1988. From the refuse, analysts recorded 5 paper light bulb containers, 4 light bulbs, and 2 electrical appliances (no televisions). This relatively low rate of discard of electrical items and light bulbs (0.11 items per pickup) suggests that these items may contribute less lead and cadmium to the environment than other sources. As in the case of lead-acid batteries, these figures contradict findings that consumer electronics were the second most prevalent source of lead in 1986 (Franklin Associates 1989:19). In this regard, it is possible that televisions are being discarded in a fashion similar to lead-acid batteries. In addition, other routes of discard, especially storage or reuse, may be important factors.

Used Oil

Table 1 identifies types of lubricating oils and their characteristics recorded from a sample of Tucson and Phoenix residential solid wastes. A total of 6.5 kilograms of motor oil were found in 31.8 metric tons of household refuse. This represents about 0.02 percent of the wastes. Dividing the amount of motor oil discarded by the number of households sampled produces a rate of discard of 190.3 grams of motor oil per household per year. Based on Rugg (1988:22) motor oil, in 1983, contained 1,100 ug/g of lead and 1 ug/g of cadmium. Thus, based on these Garbage Project generation rates, each household discards 0.2 grams of lead and 0.19 milligrams of cadmium annually from motor oil deposited in residential refuse (see Table 1). Gurnam and Associates (1979) report that the motor oil and transmission fluid that they tested contained 1,121.9 ug/g and 46.9 ug/g of zinc respectively. Applying these figures to the motor oil and transmission fluid discard rates suggests that annual generation of zinc from a household's motor oil and transmission fluid is 0.2 grams and 8.9 milligrams, respectively (Table 1). These are very low concentrations of these metals, well below natural sediment levels.

Ferrous "Tin" Cans

While lead-solder side seams on ferrous cans have been in decline (Rugg 1988, Franklin Associates 1988), a grab sample of 22 cans from Tucson, Arizona illustrates that certain can types still exhibit soldered seams. Two of the 22 cans examined had soldered seams: one, a soup can and the other, a dog food can. In addition, welded and no-seam cans have only recently replaced soldered seam cans suggesting that lead levels from cans are probably much higher in landfill refuse deposits of only a few years ago. For example, 18 cans excavated from one 1976 Sunnyvale, California landfill deposit were all soldered. The pervasiveness of the ferrous cans is illustrated through an examination of the Spring 1988 refuse data. A total of 258 cans were recorded from the 53 sample pickups. This represents 9.6 percent of all recorded items in the refuse. These cans are rapidly degrading in the landfill. Of the 18 cans examined from the 1976 deposit, all were rusting and many showed extensive degradation.

Household Dry-cell Batteries

The EPA has cited dry-cell batteries as one potentially hazardous component of residential refuse (Maples 1989:19). The reason that household batteries, in particular, are targeted is the zinc, mercury, and cadmium that are often present as constituents (see Rugg 1988, Franklin Associates 1989:155). Of the major types of commercial products usually identified as household hazardous wastes, batteries are a major component (Wilson and Rathje 1988). As discussed above, however, some other sources of heavy metals are not included in these definitions of household hazardous wastes. Depending on the size and type of battery, variable concentrations of zinc, mercury, and cadmium are present. Common carbon-zinc and alkaline batteries contain significant levels of zinc with lesser amounts of mercury, cadmium, and lead. Mercury, silver oxide, and zinc air "button" batteries, contain relatively large amounts of mercury and zinc while lithium "button" batteries contain large amounts of zinc only. Nickel-cadmium (rechargeable) batteries contain significant amounts of cadmium.

Newsprint and Magazines

According to Rugg (1988:5) newspapers contain between 10 and 2,000 ppm of lead and negligible amounts of cadmium. The higher ranges are for colored inks on newspapers. A basic level of between 10 ppm and 21 ppm lead can be given for black and white newsprint. Magazines contain between 124 ppm and 1,150 ppm lead (average of 675 ppm) and negligible amounts of cadmium (Rugg 1988:5). The amount of lead in newsprint and magazines, however, has decreased dramatically over the past 15 years (Franklin and Associates 1989:99) and lead levels in inks are highly variable. Based on the analysis of 101 excavated refuse samples from three landfills the Garbage Project estimates that 15.1 percent of landfill refuse (materials greater than half an inch in size--the screen through which the refuse is sifted) is newsprint and 2.3 percent are magazines. Of all landfill materials (including those materials which fell through the half-inch screen), 8.8 percent are newsprint and 1.3 percent are magazines (see Table 2). The four metric tons of refuse sorted likely yielded from 3.6 to 7.5 grams of lead from newspapers and 6.3 to 58.5 grams of lead from magazines. These figures represent between 0.8 ppm and 1.8 ppm lead concentration from newspapers in the landfills and 1.5 ppm and 14.4 ppm lead concentration for magazines in the landfills (see Table 2). These are very low concentrations of lead, far below natural sediment levels.

Other Pigments and Plastics

Pigments in paints, packaging, and plastic items can also be sources of lead and cadmium in MSW (Franklin Associates 1989). The discard of lead in pigments in general has decreased through time, especially in the last decade, while the amounts of cadmium in pigment wastes has increased (Franklin Associates 1989:105,169). These metals are also used as a heat stabilizer in the production of polyvinyl chloride (PVC). As the production of PVC has increased through time, the quantities of lead associated with these products has also increased (Franklin Associates 1989:109). Quantities of cadmium have remained fairly steady over time (Franklin Associates 1989:192).

Heavy Metals in the Landfill

Beyond knowing the sources of heavy metals in MSW, it is crucial to know what happens to metal-bearing products after they are co-disposed with MSW in landfills (either as raw solid wastes or as burnt/incinerator wastes). Further, the examination of the effects of specific sources of heavy metals on landfill metals migration is also of major significance. Excavations of modern landfills provide the key with which to make these necessary comparisons.

Methods

Data suitable for comparing landfill refuse with heavy metal migration are encoded in the Garbage Projects *Landfill Refuse Database*--composition characteristics recorded from refuse excavated from landfills located in Tucson, Arizona (Mullins Landfill); San Francisco Bay Area (Durham Road Landfill, Sunnyvale Landfill); Chicago, Illinois (Greene Valley Landfill, Mallard North Landfill), and New York City (Fresh Kills Landfill). Refuse was excavated and analyzed between May 1987 and October 1989 and represented materials laid down in a variety of environments including variable sediment characteristics, climate, and precipitation. The refuse was derived from a diverse range of social groups participating in an assortment of consumer and discard behaviors. Only data recorded from the Sunnyvale Landfill are reported here.

The landfill method includes both excavation and analysis. Excavation is performed using mechanized equipment--either trenches made with extended-arm backhoes (maximum depth approximately 30 feet) or wells drilled by bucket augers (approximately 90 feet). Excavation consists of sampling a number of levels from within a number of excavation units. Excavation units are selected in a judgmental fashion within areas stratified by landfill deposit age. This stratification is identified through interviews with landfill personnel and from methane well drilling records. Levels are selected in a judgmental fashion, specifically selecting residential refuse (identifiable in the field based on the types, diversity, and quantities of materials and items). Levels are selected to obtain refuse samples representative of the entire range of dates of deposition in the landfill. Dates are recorded from the ubiquitous newspapers which are present in almost every backhoe or auger bucket of residential refuse. Most newspapers are quite readable, and many have the printing dates intact. Refuse samples for detailed composition analysis are collected at approximately ten-foot intervals in depth. Approximately 100 pounds of refuse are shoveled into sample bags from the materials dropped on a wooden sampling platform by the backhoe or auger bucket. Analysis of the landfill samples starts with screening the refuse through a 1/2 inch mesh screen. Materials passing through the screen are designated as "fines." The remainder of the refuse (larger than 1/2 inch in diameter) is segregated into 19 material composition categories and recorded by weight and volume. The material composition categories include metals, plastics, paper, and organic categories. Other analyses include moisture content analysis, an item-by-item detailed analysis, and sub-sampling of "fines" and "other" categories. From the weights of material categories and data from the item-by-item analysis, quantitative and categorical estimates of heavy metal contributions can be made.

Fines from the Sunnyvale Landfill were dried in a convection oven for 3 hours at 300 degrees fahrenheit. The sediments were, then, sieved through 140 and 270 mesh screens. Sediments smaller than 270 mesh were submitted to a laboratory for heavy metals analysis. Atomic adsorption spectrometry was performed to determine concentrations of lead, zinc, cadmium, and mercury. In addition, five samples of natural sediments from Tempe and Florence, Arizona and five historic refuse deposits were treated in the same manner for comparative purposes. Comparisons between the identified metals concentrations and specific metals sources were also made. It is stressed that the concentrations reported here cannot be used to assess any liability or determine EPA-standard levels of heavy metals. This is because standard methods for geological sediments (not EPA analysis methods) were used. These concentrations are used solely for comparative purposes with background natural sediments and to identify likely sources of metal migration.

Comparison of Landfill Sediments with Natural Sediments and Historic Refuse

The concentrations of lead, zinc, cadmium, and mercury from one landfill were compared with concentrations of these metals in natural sediments from Florence and Tempe, Arizona and in historic refuse excavated in Florence, Arizona. The results of these comparisons are listed in Table 3. As shown, the landfill sediments are considerably higher in concentration for all the metals than the natural sediments and the historic refuse deposits. Assuming that artifact fragments were excluded from the sediments sieved through the 270 mesh, it is evident that some local migration of metals has occurred in both the historic deposits and the landfill sediments. The range of variation for these materials is quite high suggesting that certain deposits within the landfill and historic trash dump are more likely to contain heavy metals than others.

Metal Concentrations in Incinerated and Partially Incinerated Refuse

One potential source of high metal concentrations may be deposits of incinerated refuse. Two of the landfill samples exhibited evidence of incineration. One sample deposit, dating to 1958, was completely incinerated--melted and warped glass and metal; while another, dating to 1965, exhibited signs of burning--charred paper, warped glass, and others. While the sample sizes are too low for any kind of definitive statement on heavy metals in incinerated landfill deposits, the comparison of the average concentrations of metals in the landfill (Table 3) with the concentrations of metals from these two deposits (Table 4) is instructive. The incinerated refuse sample displays elevated levels of lead and zinc, average levels of cadmium, and low levels of mercury. It is quite likely that mercury, as the most volatile of the metals (boiling point 357 degrees compared to lead--1,740 degrees, zinc--908 degrees, and cadmium--765 degrees), was expelled from the refuse during incineration. In this particular instance it appears that lead and zinc were more highly concentrated in the refuse as a result of incineration. At lower incineration temperatures the same patterns are not evident--the partially incinerated refuse has average concentrations of lead, zinc, cadmium, and mercury (Table 4).

Deposits Containing Batteries, Electronics, and Appliances

The detailed, item-by-item refuse sort was used to identify the presence of household dry-cell batteries, electronics (including circuit boards), and appliances in landfill refuse deposits. The concentrations of lead, zinc, cadmium, and mercury in these deposits are listed in Table 4. Compared with the overall concentrations of metals in the landfill deposits, deposits associated with dry-cell batteries, electronics, and appliances do not appear to have higher metal levels. In one case, the concentration of zinc in deposits associated with batteries is slightly higher than the average amount found in the landfill. This quantity, however, is well within the range of variability exhibited in the total landfill sample. While the sample size for these analyses is admittedly small, it appears that levels of lead, zinc, cadmium, and mercury in landfill deposits are not, at least in this landfill, significantly affected by batteries, electronics, and appliances found in direct association with the deposit. This suggests that other materials located directly in the refuse deposit or sources outside of the deposit whose heavy metal constituents have migrated resulting in the higher metal concentrations.

Conclusion

It is likely that many, different sources of heavy metals are all contributing to the elevated levels observed in the study landfill. The sources and fate of heavy metals in MSW must be understood. Further research is needed to isolate the sources and behavior of heavy metals in landfills. Preliminary results, however, of the study of one landfill suggest that concentrations of lead, zinc, cadmium, and mercury may be higher in landfill sediments than natural soils (Table 3). Incinerated refuse in one landfill deposit contained elevated levels of lead and zinc, but decreased levels of mercury (Table 4). Household dry-cell batteries, electronics, and appliances--directly associated with some of the refuse deposits--did not appear to increase the likelihood of elevated levels of lead, zinc, cadmium, and mercury (Table 4). Based on data collected from household refuse, lead-acid batteries and television sets are probably discarded infrequently compared to other refuse types. This fact suggests that these items are more heterogeneously distributed in landfill deposits affecting the conditions by which metals in these products migrate from their depositional locations.

FIGURE 17.a

CHARACTERISTICS OF LUBRICATING OIL IN RESIDENTIAL REFUSE

TYPE	WEIGHT (GRAMS)	PERCENT OF TOTAL REFUSE	ANNUAL RATE PER HOUSEHOLD
HOUSEHOLD LUBRICATING OIL	350	.00109	10.3
BRAKE/HYDRAULIC FLUID	811	.00254	23.9
MOTOR OIL	6,467	.02031	190.3
ESTIMATED MOTOR OIL LEAD[1]	7.113	0.2 ppm	0.2
ESTIMATED MOTOR OIL CADMIUM[1]	6.467 mg	0.2 ppb	0.19 mg
ESTIMATED MOTOR OIL ZINC[2]	7.255	0.2 ppm	0.2
TRANSMISSION FLUID	3,062	.00961	90.1
ESTIMATED TRAN. FLUID ZINC[2]	0.143	4.5 ppb	8.9 mg
TOTAL	10,690	.03358	314.6

TOTAL WEIGHT OF REFUSE SAMPLED - 31,834 KILOGRAMS.

ESTIMATED NUMBER OF HOUSEHOLDS SAMPLED - 1,767 (household refuse pickups and estimate of households not putting their refuse out for collection on the sample pickup day).

1. Estimates of lead and cadmium in motor oil based on Rugg (1988).
2. Estimates of zinc in motor oil and transmission fluid based on Gurnam and Associates (1979).

FIGURE 17.b

ESTIMATED LEAD CONTENTS FOR NEWSPAPER AND MAGAZINES IN RESIDENTIAL LANDFILL REFUSE

TYPE	WEIGHT (KG)	PERCENT OF REFUSE > 1/2 "	PERCENT OF TOTAL SAMPLE
NEWSPRINT	358.7	15.96 %	8.88 %
MAGAZINES	50.9	2.26 %	1.26 %

		LEAD CONCENTRATION IN:	
ESTIMATED LEAD CONTENT	WEIGHT (GRAMS)	REFUSE > 1/2 "	TOTAL SAMPLE
NEWSPAPERS, MINIMUM (10 ppm)	*3.6*	*1.6 ppm*	*0.8 ppm*
NEWSPAPERS, MAXIMUM (21 ppm) *	*7.5*	*3.3 ppm*	*1.8 ppm*
MAGAZINES, MINIMUM (124 ppm)	*6.3*	*2.8 ppm*	*1.5 ppm*
MAGAZINES, MAXIMUM (1150 ppm)	*58.5*	*26.0 ppm*	*14.4 ppm*

TOTAL WEIGHT OF REFUSE > 1/2 " SAMPLED - 2247.6 KILOGRAMS.

TOTAL WEIGHT OF LANDFILL SAMPLES (INCLUDES FINES, CLAY, ROCK) - 4039.5 KILOGRAMS.

* excludes colored ink newsprint.

FIGURE 17.c

HEAVY METAL CONCENTRATIONS IN ONE LANDFILL

MATERIAL	SEDIMENT SAMPLES[1] (n-5)	HISTORIC SITE[2] (n-5)	LANDFILL (n-18)
LEAD (ppm)	55	217	942
standard deviation	27	259	1,234
ZINC (ppm)	122	259	2,450
standard deviation	46	256	2,455
CADMIUM (ppm)	0.7	1.2	13.6
standard deviation	0.3	1.1	6.7
MERCURY (ppb)	< 10	730	33,570
standard deviation	20	640	130,180

1. Sediment samples were collected from Florence and Tempe, Arizona.
2. Historic site was a residential refuse dump in Florence, Arizona dating between 1880 and 1950.

FIGURE 17.d

SOURCES OF HEAVY METALS CONCENTRATIONS IN ONE LANDFILL

SOURCE	LEAD (ppm)	ZINC (ppm)	CADMIUM (ppm)	MERCURY (ppb)
INCINERATED REFUSE	5,250	3,500	12.0	40
PARTIALLY INCINERATED REFUSE	520	680	18.0	500
DEPOSITS WITH BATTERIES (n-2)[1]	182	3,425	10.3	1,590
DEPOSITS WITH ELECTRONICS AND APPLIANCES (n-7)[1]	499	1,570	11.3	2,340

1. Average.

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SPEECH OF DONALD WOJTON FOR THE EPA CONFERENCE ON HOUSEHOLD HAZARDOUS WASTE MANAGEMENT

Good afternoon, I am Donald Wojton, Vice President of Manufacturing Services for East Penn Manufacturing, headquartered in Lyon Station, PA. East Penn Manufacturing produces automotive and industrial lead batteries and operates a secondary lead smelter. I am speaking to you today as a representative of the Battery Council International ("BCI") Environmental, Government Relations and Industrial Health Committees.

First, allow me to provide some background on BCI. BCI has over 250 member companies from throughout the world. BCI's members are engaged in the production of lead storage batteries for automotive, marine, industrial, stationary, specialty and commercial uses. BCI's members also include companies engaged in the reclamation and recycling of lead batteries once they are spent. BCI represents more than 99 percent of the nation's domestic lead battery manufacturing capacity, and approximately 92 percent of its battery recycling capacity. BCI includes all the large, multi-plant domestic manufacturers as well as the majority of the nation's smaller firms.

This presentation will provide a brief overview of the domestic lead battery manufacturing and secondary smelting markets.

The U.S. battery market is typically analyzed as one homogenous market divided into two major market segments, specifically original equipment and replacement batteries. These segments can be further broken into passenger car and light commercial batteries, which represent 72 and 78 percent of the market, respectively, for both original and replacement equipment, and such other segments as special tractors, marine, general utility, golf carts, motorcycles, and military batteries.

From 1983 through 1988, United States battery market shipments have undergone an annual 2.8% increase. In 1983, 69.7 million units were shipped, and in 1988, 80 million batteries were shipped. During this time period, the replacement market grew by 8.0 million units. This market is growing largely due to the increasing number of vehicles on the road and the increasing average age of the car fleet.

Lead battery imports, particularly for 12-volt batteries, also are growing. 12-volt batteries are broken into 3 categories, motorcycle and lawn and garden batteries, automotive batteries, and industrial stand-by batteries (e.g., those batteries used as stand-by power for utilities or hospitals.) Between 1987 and 1988, for example, there was a 40% increase in the importation of motorcycle and lawn and garden batteries, a 10% increase in automotive battery imports, and a 4.2% increase in industrial stand-by battery imports. These batteries are produced in Japan, Korea, Taiwan, Brazil, Canada and Mexico.

The domestic lead battery manufacturing business is very regionally and nationally focused. Lead batteries are produced in approximately 2 dozen states and then taken to distribution facilities across the country. The batteries are then distributed to battery dealers throughout a region.

The lead battery industry also historically has relied upon the use of recycled lead for the production of new batteries. Traditionally, the demand for secondary lead increases when the supply of primary lead is relatively low and lead prices are high. For example, in 1979 the price of lead was approximately 60¢ per pound and secondary lead production reached 750,000 tons. The years following 1979, however, saw lead prices fall to 17.5¢ per pound, and secondary production dropped to 550,000 tons. In addition, by 1985, 15 secondary smelters closed their facilities resulting in a loss of 500,000 tons of lead smelting capacity. There are now 23 domestic secondary lead smelters.

In contrast, traditionally, the U.S. primary lead industry has remained stable. In 1986, however, this began to change when through consolidations and closings approximately 140,000 tons of primary production were removed from the market.

In 1988, the U.S. secondary lead smelters produced approximately 700,000 tons of secondary lead, almost reaching the level produced in 1979, with no commensurate increase in capacity. This increased production has been achieved through more efficient scrap processing and better furnace yields.

Secondary lead smelting capacity also is increasing. There are a number of secondary smelters bringing new capacity on-line, and one domestic primary smelter also is building secondary capacity.

In addition, it has become increasingly apparent that the role of secondary smelters is changing. With increasing environmental regulations and the focus on removing items such as batteries from the municipal waste stream, increased pressure is being put on the system to recycle.

To translate battery production and recycling numbers into an actual battery recycling rate is extremely difficult. EPA, in its Agenda for Action and the Sources of Lead and Cadmium report, states that currently 80% of the lead automotive batteries are recycled. BCI believes, however, that the rate is higher than 80%.

FIGURE 18

U.S. SECONDARY LEAD SMELTERS

ALCO Metals	Los Angeles, CA
East Penn MFG.	Lyon Station, PA
Exide Corp.	Reading, PA (General Batt. Corp.)
Exide Corp.	Muncie, IND
Exide Corp.	Dallas, TX (Dixie Metals Corp.)
GNB, Inc.	Columbus, GA
GNB, Inc.	Frisco, TX
GNB, Inc.	Los Angeles, CA
General Smelting & Refining	Cottage Grove, TN
Gopher Smelting & Refining	Minneapolis, MN
Gulf Coast Lead	Tampa, FL
Interstate Lead	Leeds, AL
Refined Metals	Beech Grove, IND
Refined Metals	Memphis, TN
Ross Metals	Rossville, TN
RSR Corp.	Middletown, NY
RSR Corp.	Indianapolis, IND
RSR Corp.	Los Angeles, CA
Sanders Lead	Troy, AL
Schuylkill Metals	Baton Rouge, LA
Schuylkill Metals	Cannon Hollow, MO

Source: East Penn Mfg.
November 1989

Recently, BCI began a project to collect data from both battery manufacturers, recyclers, and exporters to develop a current and accurate battery recycling rate. BCI has developed the model and currently is waiting for a final piece of information before beginning the data collection effort. BCI hopes to publish the first annual report by the end of the first quarter in 1990.

The Battery Council International is committed to increasing the overall lead battery recycling rate. I will elaborate on the activities BCI has undertaken to accomplish this goal, and various of the BCI positions, in my next presentation on recycling.

I am happy to answer any questions you may have.

EDUCATIONAL MATERIAL

Joan Dotson
League of Women Voters
Redlands, California

Community education or public education is a major factor in household hazardous waste programs. Without a strong education effort your household hazardous waste programs will fail. I plan for success and that is why I place much emphasis on community or public education.

First of all, there are so many resources already available, unlike four or five years ago, when we had to develop all of it to support our one day collection programs. Getting started with simple, factual community education is quite easy and need not be costly. Take any of the literature available and adapt it to your community and get on with your program. Be sure to include credit to the original author.

In your community education program, you can utilize simple fact sheets about household hazardous waste, and posters and brochures too if your budget allows. You can take advantage of utility bills for one or two line messages. You can use a phone line with a recorded message about household hazardous waste in your city's solid waste department if you can't spare a real person to explain the do's and don'ts to your citizens.

We have a weekly "market nite" in my city, perhaps your city has a similar program. That's a good place to distribute information; or shopping malls often have display tables or attractions on the weekends, so that opportunity can be used effectively.

Group presentations are another way to educate. You can use a speakers bureau for instance, made up of League of Women Voters or others, who can speak knowledgeably about household hazardous waste. Service organizations are always seeking to inform their members on issues and the program chairperson for Rotary, Kiwanis, PTA's, or Senior Citizen groups such as AARP would be cooperative.

Other resources for community education are the newspapers, Chamber of Commerce newsletter, public affairs programs on radio and TV, and any local magazines or publications that you might have.

Community education programs need not be limited to waste management tips. It has been said that, "the one source reduction function of household hazardous waste programs is their public education effort to inform consumers about alternatives that will decrease toxic waste generation in the home". Emphasize buying tips such as, "Buy only what you need".

In addition to educational materials for the general public, we need to focus on school curriculum programs. In Lexington, Mass., where the first special household hazardous waste collection day was held in 1982, the Director of Public Health has stated that, "Education is crucial. We need to work with the kids, if they don't get the message, then we have a problem that is going to continue into the future".

In California the San Bernardino County Environmental Health Services Department developed a household hazardous waste school education kit that also includes a video. School district administrators were contacted to ensure that such a program could be implemented into the school curriculum. Then a working committee composed of teachers representing grades K thru 6 was formed. A consensus determined that a program that gave teachers the household hazardous waste program objectives and allowed them to use their own creativity and skills in developing lesson plans and teaching methods was the goal.

Much attention was given to in-service teacher training for the successful implementation of the household hazardous waste education program. This can be accomplished through local universities usually through extension programs, since this allows teachers to obtain continuing education units as well.

The success of household hazardous waste programs for secondary schools depends greatly on the quality and motivation of the teachers.

Periodic review and revision of instruction is also an essential part of every program because the school curriculum should be based on current knowledge and activities. Household hazardous waste education should be a totally integrated program. By that I mean, household hazardous waste education must take place in the home, the school and the community. Whatever is taught and practiced at school should be reinforced at home and supported by the community.

In conclusion, household hazardous waste school programs can be developed and used to increase the level of awareness about hazardous waste, change students attitudes and behaviors and help them become part of the problem solving process.

Household hazardous waste separation and reduction is helping us in Redlands, CA with our recycling program and will also assist us in our landfill expansion project or any other alternative we may have to consider. Household hazardous waste programs have raised consumers collective consciousness of hazardous materials in their households.

Another important targeted group for household hazardous waste education should be the consuming public at the point of purchase. Education programs should be designed to target the purchaser with information and promotional materials. We are not saying they can't buy these products- we want to say, "be responsible when you do purchase them". Obviously manufacturers give great weight to consumer needs and demands and so consumer concern about the disposal impact of their purchases could lead manufacturers to make changes in their products. In fact we have already begun to see some of that happen according to the Chemical Manufacturers Association. Also, retailers today want to appeal any way they can to consumers; so if consumers are concerned about the household hazardous waste that products create, retailers will respond in order to appear responsible and appeal to the environmentally conscious and concerned consumer.

In California, the League of Women Voters of California is beginning a public education project on hazardous waste reduction. They have grants totalling $125,000 to produce a TV program that will be broadcast throughout the state. The focus will be to inform consumers that preventing pollution is everybody's business and that there are small practical steps that all individual viewers can take to reduce their own impact on the environment.

For a list of all the materials available on household hazardous waste please refer to the bibliography in the conference summary.

EDUCATION: THE KEY TO GOOD MEDIA COVERAGE

Martha S. Murphy

You've researched the problem of household hazardous waste (HHHW); determined what it means to your community or state now and what it will mean in the future; juggled figures till your fingers hurt; literally sold your convictions to the city or county council or the state legislature; and all is "go". Now it's time to throw this enormous and expensive party. But what happens if nobody comes? Afterall, the first collection day is usually the hardest to sell to the public because few people are aware of the problem.

When Raleigh, North Carolina planned their first HHHW collection day for April 1, 1989 they estimated approximately 550 car loads of household hazardous waste would be delivered to the collection site, based on other "first days" around the country. The citizens of the Research Triangle area turned out at twice that figure. What was the key to such a turnout? Excellent media coverage. And what's the key to such outstanding media coverage? Education.

Now, your first reaction may be, "I don't have to educate reporters. They're college graduates dedicated to seeking the truth...obligated to report important matters. It only makes sense that cleaning up the environment be considered important. After all, the media is always objective. Right?" Wrong.

Please don't misunderstand. This is NOT going to be a media bashing. Look at it this way...if a person knows little or nothing about a subject, they aren't likely to be begging their assignment editor to let them do a one-shot story on it. Depending on the size of the city in which you live, a television station's entire staff of reporters - other than the anchor person - may have just graduated from college. No experience. Not a lot of wisdom or maturity that supposedly comes with age. Maybe they've heard about the garbage barge from "up north", but it wasn't in their coverage area. So it didn't have a lot of impact on their definition of "Important Issues."

Maybe the assignment editor has been badgered by an overzealous environmentalist and has developed a negative attitude about the issue of hazardous waste in general. Suddenly your job becomes one of not only educating the media about HHHW but reprogramming their thinking to see it in a more positive light.

Your job is to educate the media about the need for household hazardous waste programs and to convince them to pass their knowledge along to the public. So, be direct...give them the facts!

Select the one or two reporters you think are best in each form of media and court them. Schedule an appointment or take him or her to lunch and ask for help. Tell them that the first household hazardous waste collection program was initiated in 1981 and that more than 1,300 programs were held in 43 states by the end of 1988 as well as the reasons for a collection program. Tell the reporter that according to the publication, Hazardous Waste...In Your Home published by the North Carolina Governor's Waste Management Board, each community of 20,000 uses approximately 100,000 pounds of hazardous home personal products, 1,000 pounds of pesticides and 3,000 gallons of automotive and paint products....the disposal of which is not generally regulated by the federal or state government. Without a HHHW collection day, the disposal of these items is usually accomplished by pouring the leftovers down the drain or putting it in the trash.

Provide the reporter with the facts and figures you receive in your convention book - there'll be lots of them. Contact the EPA. Call Dana Duxberry and Associates for their list of every HHHW collection program that's been conducted and which cities had the best turnout. Call the person in charge of that program and ask for all the information they can provide you. And while you're doing this, be certain to ask for permission to reprint or buy their brochures.

A good reporter will look to see what this is all about...research the size of the problem in your area...realize the impact he or she can make by being the one to "break" a story of this importance...and report it.

According to Liz McCormick of GSX Chemical Services, there are usually three factors which influence a community to sponsor a HHHW collection program. The first is a wish to do something good for the environment. The second is education. A public education program won't get all the waste out of a community, but it will influence a large percentage of the population to recognize the hazards associated with their lifestyle, influence them to buy more sensibly, to minimize the hazardous products they use around the home, to more safely manage those hazardous products they must use, and to support a HHHW collection program when it's held.

The third reason is the result of the first two. If you've educated the public and they've responded, then you must give them a legitimate way to properly dispose of the materials. GSX Chemical Services has conducted more than 300 collection programs across the country; and even when the percentage of people responding from a community is small, the volumes of wastes are staggering. The media needs to know this.

One of the reasons business and industry support household hazardous waste programs is that when the public learns more about HHHW and becomes less afraid of it, they usually become less afraid of the by-products being produced by the industry down the road and more aware of whether or not that industry is properly disposing of its toxics.

Your long-term education process starts months in advance and continues long after your collection day. When the City of Raleigh conducted North Carolina's first HHHW program this year, TechKnowledge, a public relations firm, was hired to assist the City with a comprehensive public information campaign. Your city may or may not elect to use an outside PR firm as you may have that capability in-house, and the campaign doesn't have to be expensive. Raleigh spent less than $20,000 of public money on publicity and education. And, according to Katharine Neal of TechKnowledge, the biggest mistake you can make is to rely solely on the news media for the success of a collection program. You must have widespread public and corporate education, leadership and support.

The Raleigh campaign began months in advance with the formation of a steering committee from both the public and private sectors. Special emphasis was placed on securing corporate sponsors from both retail and industry as well as the chamber of commerce. This makes sense for several reasons: These are the people who make or sell us just about everything we use that might be hazardous, and it is good public relations for them to participate in a program such as this. They may contribute money to offset the cost of printing flyers and brochures or to purchase corporate sponsored advertising. They may publish information in their corporate newsletters, etc. In addition, when the time comes to begin the direct education of the media, the media tend to sit up and pay more attention when influential community leaders are involved.

The next step is the development of a speakers bureau that covers the "chicken and pea" circuit like a blanket. In support of the speakers, approach private groups or industry to sponsor a video documentary or audio/visual slide program that can be used as speaker support tools.

Rotarians, Optimists, JC's and others like them are usually the concerned citizens of a community and will respond to education programs and calls for action. As the marketing and public relations agency for GSX, we have found an invaluable tool in the members of the League of Women Voters, and we are beginning to see a similar response from the garden club councils - all because of making them aware of household hazardous waste.

The first public event of the Raleigh, North Carolina public education campaign included a poster contest for elementary school children, an essay contest for junior and senior high students and a video script contest for high school students, all leading up to the collection day planned five or six months down the road. These contests and the collection day were announced via a press conference held by prominent educators, city officials and community leaders. Media education really began at this point.

You may develop your own logo character such as Walt Wastenot, recently introduced by WASTE ALTERNATIVES/WASTE REDUCTION AND RECYCLING magazines, to teach elementary school kids about recycling. School officials across the country have responded by requesting almost 200,000 reprints to be distributed to students during classroom discussions. What kids learn in elementary school frequently goes home to their parents and is their first exposure to information about hazardous waste. This also makes a good enclosure in the press kit when it is developed.

About four to six weeks after the campaign kickoff, come back with another event to capture the media's interest and build public awareness. Establish a Hazardous Waste Hotline to answer the public's questions about HHHW or recycling, provide information about the upcoming collection day, what is hazardous and should not be put down the drain or thrown in the garbage, etc. Announce this hotline with a press conference complete with good visuals for the media's use.

Raleigh developed a T-shirt with their HHHW collection program logo and sponsor information. This shirt was given to school contest winners, put in the press kit and given to everyone who brought waste to the collection day.

The next step is to design a flyer with collection day information INCLUDING a list of wastes to be collected. These flyers should be handed out by volunteers at malls, schools, car washes, the local PTA meeting, included in church bulletins...anywhere there are people. A brochure with more detailed information such as alternatives to waste-generating products and less hazardous consumerism may also be designed for distribution at the Collection Day site - and, of course, for the media in the press kit.

The flyer design should be incorporated into a poster design and printed as needed.

Utility companies, department stores, etc., should be solicited to include information as stuffers in their bills. We must point out, however, that this is becoming less and less available.

Grocery stores may stuff flyers in every sack of groceries. Major employers INCLUDING THE CITY, COUNTY AND STATE should be solicited to include stories about the problem and the solution in their employee newsletters.

But, one more thing.....You and the Media both have things to learn. Now is the time that you MUST educate yourself about any requirements the MEDIA has regarding materials furnished them for both PSA use and news coverage. The public affairs director and the news director are ususally the people to contact for this information.

As a rule of thumb, you will usually get a lot more coverage from radio than either television or newspaper. In years past, radio and television station owners were required to provide a certain amount of time for public service announcements in order to retain their licenses - those activities which serve for the good of the public and which usually are non-profit in nature. Newspapers have never been required to do so. Since deregulation of the broadcast industry, public service time is no longer required by law, and the amount of time available at any given station may have been cut back. Most broadcasters are pickier now than in the past about what they give time to and in what form. Many radio stations, for instance, do not accept recorded announcements as they want their air personalities to tell the public about your event. It allows them to control the quality of delivery, and to control the length of announcements to prevent turnoff from data that's too long. Most radio stations restrict PSA's to :10 to :15 seconds in length. Many television stations have built-in :10 second breaks, some of which are usually in prime time. Your :10 second PSA may get you better placement and therefore better visability than a :30.

Newspapers infrequently run an actual public service ad. That's ok because well written stories on different aspects of the problem and the solution are much preferred. And don't forget the weekly calendars, weekend section, and other "to do" sections of the paper. People do read them.

Now that you've researched the media's needs, the next step is to develop and produce newspaper, radio and television public service announcements. If you have a public television or radio station in your area, they may do this type of work for you at no charge. Many advertsing agencies will donate mechanical work for a newspaper ad when they wouldn't dream of giving you money. Also, the waste management company you are working with may have public service announcements for your use.

There is one word of caution concerning public service time/space. If you PURCHASE ad space for your HHHW collection day in the local newspaper and then ask radio and television stations to DONATE time for your cause, you may understandably find a lot of resistance. If you have money to buy advertising, spread it around as evenly as possible. For instance, try to get the newspaper to agree to 2 public service ads for every one you buy...the radio/tv stations to 2 PSA's for every commercial you buy.

It's also time to begin scheduling speakers on radio talk shows or television community interest shows, particularly call-in shows. These types of programs are frequently booked months in advance, and you want to be certain of obtaining time for the week or two before your HHHW collection day. And don't forget the cable channel's local access programming or public radio and tv.

And...now's the time to develop the press kit you will present the news corps when you begin your media blitz ten days to two weeks before your HHHW collection day.

The press kit is critical in the education of the media. But it is NOT something you just mail out or hand to a reporter with no other communication. The press kit should contain a cover letter providing the pertinent information about your HHHW collection program, a news release containing that same information and more....the who, what, when, where, how and why data in plain, simple-to-understand, consumer-oriented English. For example:

Who: Who should be concerned about HHHW? Anyone who drives anything other than a horse and wears anything other than animal skins contributes to the problems of hazardous waste.

That's plain and simple enough for anyone to understand.

What: What is hazardous waste? Provide lists of products commonly found around the home that are considered hazardous when discarded. Most people are amazed when they read a list such as this. How about a photograph of dozens of household products which are considered hazardous waste when discarded with a check-list below it? Here again, high quality, ready-to-use material is most likely to be used by the media.

When: The date and time of your HHHW collection program.

Where: The location INCLUDING a site map with traffic flow patterns for getting in, unloading and getting out in the easiest and safest manner possible.

How: Data on how the collected waste will be recycled, treated or disposed of after the collection program.

Why: Why do we need to keep these hazardous products out of our landfills and water/sewer systems? What are the dangers of HHHW?
If your area has a contaminated ground water problem at the local landfill or the landfill is too overcrowded to be safe, tell the media.

Another way to put the problems into perspective is to provide information on the difference between a secure landfill and an unsecured one in terms of the kinds of treatment required of materials deposited at a secure landfill which are allowed to be discarded by a private citizen into a local county landfill untreated.

Press kit information should also contain:

- A statement by a well-known public official such as the mayor and/or community leaders serving on the steering committee.

- Pamphlets or reprints of articles on HHHW and/or other cities efforts at HHHW collection days.

- A list of problems which are frequently caused by HHHW in municipal solid waste such as sanitation workers' injuries, equipment damage, leachate into the groundwater, air emissions, and so forth.

- The Hotline phone number for citizens questions.

- Copies of Public Service Announcement scripts and produced commercials

Now that all of this has been prepared, it's time to begin. One month out begin distributing flyers in public areas and continue weekly until collection day. At two weeks out, send flyers home with all elementary and junior high school students.

Three to four weeks before the collection day, put up posters in high traffic areas all over the city.

At two to three weeks out, reporters AND public affairs directors of all the area media should be invited to a press conference...but not just an ordinary press conference with "talking heads" announcing your HHHW collection day. The City of Raleigh and TechKnowledge Communications had the right idea when they invited the media representatives to an "event": A walk-through tour of the home of a well-known area resident guided by an expert in HHHW. During the tour, hazardous substances found in almost every room of any ordinary home, including the garage or storage area, were pointed out to the media representatives. Also to be noted is what happens when we improperly dispose of them.

The results of an "event" like this versus an ordinary talking heads press conference is a large increase in the amount of coverage given by the media...both in the public affairs arena and the news arena. You've provided an enormous photo opportunity for television and newspaper as well as good sound bytes or longer interviews for radio. You should encourage television and newspaper story series - for instance, 3 or 4-part story coverage - the last week prior to the collection day for heightened public awareness.

Now is the time to run the ads paid for by corporate sponsors with sponsor identification.

Establish a committee to call every radio station in town on the Thursday and Friday prior to the collection day to talk on-air about the upcoming event. This is your last-ditch public awareness effort.

Now it's C-Day. Your first HHHW Collection Day. Law enforcement is on hand to direct traffic. The waste management company employees are there to accept, manifest, separate and remove the wastes brought in, your crew of volunteers is on hand to tie it all together, and a media contact person is seeing to it that the reporters and cameramen get all the help and information they need.

As the people leave, volunteers should hand out the brochure providing information on alternatives to waste-generating products, smarter consumerism, safe packaging of hazardous waste while waiting for another HHHW collection day, etc.

Be certain to get video copies of tv news coverage, preferably on 3/4" tape, and clip any coverage given in the newspaper for future promotional use.

In just a few days, you should call a press conference to describe the recently completed program including participation, types and amounts of waste collected, the ultimate destination of collected waste including any possible recycling, and other pertinent information.

Provide the media with photographs of the just completed collection day.

Most importantly, this is the time if possible to announce your city's next HHHW collection day - while interest is high and the public AND the media are motivated.

And now it's time to start all over again!

HOUSEHOLD HAZARDOUS COLLECTION SPONSORS

Leslie Lewis, Citizens Participation Coordinator, Connecticut Department of Environmental Protection, Hartford, CT.

When it comes to sponsoring a HHW collection program, no one entity is the "best." For each individual town, county, or state, there will be a number of possibilities.

Who has sponsored collections around the country so far? First a look at industry. As was reported earlier, Dow Chemical has held collections at their Midland, MI and Baton Rouge, LA facilities. Hercules Incorporated did the same in DE. Monsanto and Browning-Ferris Industries have also had involvement in this area. Sometimes firms which specialize in hazardous waste disposal offer their services free of charge to the community in which they are located. Clean Harbors, Inc. and GSX have used this approach. In particular, communities where these companies' facilities are located are the beneficiaries of these community relations programs. Other corporations, such as Union Carbide and Stauffer Chemical have provided educational materials. In CT Stauffer Chemical designed and did mechanicals for the state's brochures and the CT Business and Industries Association and the CT Petroleum Council paid for publication of 100,000 brochures. It was a very good thing for Lewis's department since they had no money for them. Finally, in CT two firms which were charged with violating the state's hazardous waste regulations donated money for HHW collections in lieu of paying fines -- a different approach to gaining sponsorship.

The Environmental Protection Agency has made some funding available to states through the regional grant program. This money has in turn gone to help establish collections at the local level. Minnesota is one state which chose this method of sponsorship. A lot of those monies are drying up, but even if five requests are turned down, the sixth may be funded.

Several states have elected to undertake collection programs. Florida, has had the biggest program which covered every county. The Amnesty Days project involved a series of county wide collections designed to service households, farms, institutions, and some small businesses. The state took care of everything: publicity, hiring the contractor, collection costs, etc. Rhode Island has a similar regional program. Minnesota very actively co-sponsors and administers the program along with the community. Other states, including IA, KS, NY, and AL have sponsored pilot collection days. In CT, the state has money but does not think of itself as a co-sponsor, because the towns do the majority of the planning. Depending on how "sponsorship" is defined, there are a number of states which have matching grant programs and get involved in that way.

County governments get involved. That is something that people in the West and Midwest have as a great luxury-a strong county government system. In CT each one of the 169 towns believes that it is a sovereign entity and no regional group is going to tell them what they have to do. Having a county government system set up to handle collection programs regionally is a real benefit. States such as CO, CA, MI, WA, and MD have done programs on a county wide basis. Cooperative Extension Services, Conservation Districts, county or regional planning agencies have all lent their expertise to these events. A more ambitious approach has been undertaken in San Bernardino County, CA, where a series of permanent transfer facilities has been established. The county health department administers the program, whch is funded through a surcharge on each ton of garbage disposed in the county.

Town - by - town is yet another approach. In CT towns with as few as 14,000 people are trying to do these collections by themselves. It means that there is a much smaller pool of people to draw from, but in MA and CT and other states collections have been done town - by - town or a group of towns through local initiatives.

On a county or town basis the following local agencies have sponsored events:

- County/local health departments

  They have a vested interest in seeing that HHW is out of the home environment as well as the greater environment.

- Fire Departments

  Connecticut has had outstanding support from them. This is especially true with fire departments which have active "HAZ-MAT" (hazardous materials) teams. Not only have they been helpful with site layout and safety, but if a situation arises where the contractor will not handle certain materials, the fire department staff have had the training and technical expertise and can help out.

- Town Planners

- **Public Works/Sanitation Departments**

  They get involved with wastewater treatment through solid waste management. Frequently CT uses town garages as collection sites and being able to work through the Public Works Department makes things very easy.

- **Solid Waste/Waste Water Managers**

  They have an interest in making sure that their particular entity runs properly. Diverting HHW from the waste stream makes their jobs easier.

- **Cooperative Extension Services/Soil Conservation Services**

  Cooperative Extension does a great deal of education on products in the home. They have been very helpful. The Soil Conservation Service have been helpful with groups that are near or involved with small farms.

- **Regional Planning Agencies**

  These may not exist in all states, but in CT they have acted in lieu of a county government planning system in many cases. In CT and MA as well, they have put together several very successful multi-town events.

- **Conservation Commissions**

  In CT every town has such a commission to deal with their open space planning and other more technical environmental projects. For greater community visibility many commissions have latched on to the HHW collection programs. This has proven to be effective, and has frequently helped to revitalize a somewhat dormant conservation commission.

- **Civil Preparedness Offices/Emergency Response Coordinators**

  With the passage of the SARA amendments they are becoming more involved in local hazardous waste issues anyway so that they find that the HHW collections fit in nicely.

Other possibilities exist. Be creative.

It is important that the state, county, or local government body which sponsors the HHW collection have a strong commitment to the program. This gives the initiative credibility. In many cases the agency has professional staff which can stay on top of planning and implementing the collection.

Sponsorship may also come from private entities. No matter who is the primary sponsor of a HHW event, secondary sponsors can be very helpful as well. In CT they have had extremely good cooperation from their local water companies. They see these projects as vital to the protection of their well-heads, their groundwater wells and resources. In fact, when CT needed to have more brochures reprinted, a local water company volunteered to reprint as many as were needed, because they saw it as a very important public education project and they wanted to be involved.

The League of Women Voters is indispensable. On the local, state, and national level they are an absolutely essential entity to have involve in these programs. They can apply pressure to public officials better than any other group. If there are concerns about gaining the support of local officials, contract the local League. There is generally a quick turnaround once the League is involved.

Environmental and public service organizations have actively supported HHW programs in a variety of ways. In CT local chapters of the Sierra Club and the Audubon Society helped to publicize collection days. People feel the issue of HHW very immediately, in their own homes and communities. Environmental groups often have difficultly getting across "big picture" issues, but collection programs, which are close to home, give environmental groups a chance to gain grassroots support. Civic groups like the Lions and the Rotary have provided traffic control. They can do a very effective job of spreading the word. Neighborhood associations provide links to the different communities in large cities. Hospitals have manned hotlines and offered their assistance in disposing of waste pharmaceutical products. In Seattle, the YMCA was actively involved with promoting the "mega-collection" which serviced over 4,000 households in one day.

There are obviously pros and cons associated with multiple sponsorship of HHW projects. On the one hand, a variety of organizations means a large potential workforce with expertise in many areas. However, unless tasks are specifically assigned to each group, there is the danger of a "too many cooks" situation arising. It should be very well-defined which is the lead agency and which other groups are to be involved and in which roles.

In Manchester, CT, a fairly large town, five members of conservation commission planned an event on their own. They had 35 participants. On the other hand, in Stamford, CT, a large city, the Sanitation Department, the water companies, the fire department, conservationists and the Stamford Jr. Women's Club, the League of Women Voters were all involved. Their first ever collection brought out over 550 families. It was really too many, but it was a great participation rate. In the Litchfield Hill District, composed of seven towns, a company, selectmen, garden clubs, conservation commissions, League of Women Voters, all were involved. Over 450 families came into the collection event.

No matter who sponsors a HHW collection there should be a definite commitment from a county, municipal or state agency to give credibility to the program. (A lesson CT learned from their recycling program.)

If you only rely on volunteers, Volunteer burnout over the years can occur. It is important to have professional staff.

Use everybody you can. Knock on doors. Be creative. Everyone can be tied into HHW programs.

IMPLEMENTING A CURRICULUM

by Joy Williams

Key word: Flexibility, both in design of the material and in the levels of implementation you want.

There are problems inherent in trying to implement a new curriculum. These obstacles can be overcome, but before you decide that you want to get lessons on household toxics into your school, find out what these obstacles are. There are other ways you may be able to reach children, and these may be more appropriate to your circumstances.

Problems inherent in implementing a new curriculum and how a number of different programs have addressed them:

1. **Many layers of bureaucracy.** Where should you start to implement - at the state, local school district, principal, or individual teacher level?

   a. What role does the state department of education play in your state? In some it has little to say about content of material taught - this is controlled by the local school district (Rhode Island, for example). In most states, however, guidelines of varying complexity are mandated at the state level. Implementing a program state wide may not be your goal, but you need to make certain your material meets state requirements and guidelines.

   b. There is not complete agreement among those who have implemented curricula on the best level to approach - school district, school principal, or teacher. Starting with the district seems to be the most universal approach... and you certainly want their approval - especially if you want to distribute announcements through the district mail system. However, we feel that it is important to also include some mechanism for reaching principals and teachers directly. There are always some teachers and principals who will be dying to use it - make it available (they're good advertisement for the program).

   Rhode Island started implementation through a grass roots organization of environmental educators - teachers training other teachers. This approach is also used by San Bernardino and San Diego. Michigan's Ecology Center has a unique variation on this - they produced an instructional video for the teachers - they interviewed teachers, and in the interviews the teachers give tips on how to incorporate the lessons in the classroom.

2. **Teacher overload.** A teacher's time and classroom time are heavily taxed. No matter how concerned a teacher may be, he or she will have to make choices as to what can be

accomplished in the classroom, especially when it comes to programs perceived as "elective."

a. Don't present the material as an "elective" but as fulfilling your state's framework on (health, science, whatever).

b. Present the unit as serving double duty ... the subject matter is household toxics; the learning skills are reading, math, history, science, health, etc. Rhode Island has units for all subject areas taught.

c. Flexibility. Don't design a program that does not work if you cannot do the whole thing, or that has to be taught in a certain way. Give teachers the information, work sheets, etc. that they need...let them use their teaching skills. San Bernardino doesn't provide specific classroom exercises, but provides teachers with the information they need. Rhode Island has many separate units. We have a number of exercises with a suggested presentation, but encourage teachers to be creative.

3. **Long-term commitment.** To actually get a curriculum adopted as a formal part of the curriculum may be difficult - especially if you're working with a large number of separate school districts. (San Diego County, for example, has about 48 separate school districts.) Be prepared for a long-term endeavor, if that is your goal.

If the program was developed as part of an independent grant, there may not be the financial resources available to see this through. In these cases, consider how to get the material into other networks which can further implementation.

Be flexible concerning what implementation is "acceptable" to you. Some school districts may incorporate certain elements as required material; others may leave it to the schools' or teachers discretion.

4. **Financial obligation from the schools.** Most school districts have limited funds, so it is best if you can give your materials/training to the schools and teachers free of charge. If not, can the cost be kept down to permit implementation?

San Diego, San Bernardino, and Rhode Island all provide the material free of charge to teachers within their jurisdictions.

5. **Trainings.** Training teachers can be costly and time consuming, and discourage some teachers from using the material. On the other hand, teachers do not always read background information which is supplied and without some training may not be adequately prepared to answer questions

or relate the problem of "household hazardous materials" to the larger issue of "hazardous materials."

> San Bernardino provides teacher in-services, but they are not mandatory in order to receive the material. However, one teacher in each school is usually trained and serves as a mentor for others. Rhode Island and San Diego both require attendance at teacher training workshops before distribution of material. (Although for the middle and junior high material trainings will be offered, but not required.)
>
> Michigan's video offers an alternative training which can reduce both costs and staff time.

6. **Bilingual materials.** You may have the material available in more than one language if it is to receive widespread implementation. In San Diego, approximately 41% of students have limited English proficiency. We've translated some of the elementary material into Spanish.

Solutions.

1. Try to get input from as many levels of bureaucracy as possible during the design period. However, just because you have the appropriate people on your advisory committee, don't assume implementation will be easy. Part of the function of school personnel at all levels is curriculum development. It is necessary to keep those on your advisory committee involved and committed.

   Also, get as much support from outside of the school system as possible - government officials, PTAs and individual parents, the media.

2. Try to make the material as teacher-friendly as possible. Have the lessons do double duty...while the subject matter may be "household toxics" the learning skills should be clearly delineated. There are so many subjects teachers have to teach, and often so much pressure on them to be the conscience of society, that many teachers will balk at the idea of having to teach one more thing.

3. Be prepared for incremental or multi-level implementation. Make the material available for individual teachers who want to teach the lessons right away, but continue to work at the school and school district level for across-the-board implementation. This may involve pilot programs and assessment of an individual school or school district's needs.

4. Make certain schools and classrooms receive kudos for implementing the program. Press events, posters, souvenirs (stickers, workbooks) are ways to do this.

Some other ideas.

1. Importance of a brochure/flyer outlining what is available. This should be your selling piece. We have just distributed our new brochure and so far the response seems to be better than our earlier letters.

2. To charge or not to charge. This may depend upon the types of materials you have designed. Easily replicated material can get a wider distribution, but how much will actually be used? If they pay for the material - or the training - they may value it more.

3. Teachers always need continuing education units - you may be able to make your training qualify - especially if you combine your training with other environmental trainings to make it long enough - or attractive enough.

4. Closed circuit TV in schools and electronic communication bulletin boards may be a good way to announce the availability of the material and/or upcoming trainings.

Follow up:

1. Getting evaluations back is important, especially when the program is new. As people don't generally rush to return evaluation forms, an aggressive followup program should be incorporated into the implementation program.

Other options.

Assess if a school curriculum program is really the way you want to go - there may be other ways you can reach children ... school or classroom presentations by non-teachers; programs in museums; working with Scouts, Boys/Girls Clubs, and other youth groups; TV programs, computer programs.

Look at your goals, your funding, your availability of staff and time for training and support.

STATE REGULATIONS AND GUIDELINES FOR HOUSEHOLD HAZARDOUS WASTE MANAGEMENT PROGRAMS

Dana Duxbury
Dana Duxbury & Associates

State agencies have developed a wide variety of regulations or guidelines for HHWM programs. They break down into regulations or guidelines for one-day events or for permanent facilities. Some states regulate these facilities as hazardous waste management facilities; others as solid waste facilities.

HHW

HHW is not regulated by federal law, or by any state other than California. States and the EPA recommend that accumulated HHW be managed as though they were regulated hazardous wastes. Program sponsors or the hazardous waste contractor acquire an EPA identification number for the collection program. Wastes which are managed as hazardous wastes (some are re-used, some recycled) are sent to a licensed hazardous waste treatment, storage, and disposal facility (TSDF) with either a manifest or shipping papers.

Regulation of One-Day Collections

States including Washington, Connecticut, Michigan, New York, New Hampshire, Florida, Wisconsin, Kansas, and Massachusetts have developed guidelines or regulations for holding HHW collection days. Regulations or guidelines pertain to issues including siting, on-site and off-site waste management, health and safety, traffic control, site management, emergency planning, and other issues. Connecticut requires a plan to be developed and approved by the state. New York requires on-site state regulators to be present at collections.

Permanent Facilities

Permanent HHWM facilities have been established in 10 states. Two of these states have developed regulations for permanent facilities - New York and Massachusetts. Two states, Connecticut and California, are in the process of developing regulations. New York and Connecticut will regulate permanent facilities as solid waste facilities. California will regulate facilities as hazardous waste facilities, and Massachusetts regulates facilities as hazardous waste generators.

Permanent facility permit requirements in New York cover three areas: operations; emergency preparedness and prevention; and contingency plans. Under the operations area, six issues are covered:

1. Site and facility requirements
2. Waste identification and management
3. Training
4. Inspections
5. Closure plan
6. Security

Regulations for permanent HHW collection centers in Massachusetts require site and operations plans, and management standards. Requirements pertaining to site and operations planning include: map of site and surrounding area; information demonstrating that the site will not impact negatively on public health or environment; procedures for determining whether the sponsor or contractor is the hazardous waste generator; physical description of the collection center; list of HHW and very small quantity generator (VSQG) waste accepted; plan for managing waste brought after-hours; a public education/source reduction plan; financial assurance plan; closure plan.

Management standards require signage to indicate intended traffic flow and wastes accepted, adequate space, provision of an attendant when site is open, compliance with solid waste requirements if at a solid waste site, no underground tanks, ventilation if accumulation area is indoors, and no smoking.

Permanent HHWM facility regulations in New York and Massachusetts have adopted a number of the hazardous waste generator regulations of the Resource Conservation and Recovery Act (RCRA). New York also incorporates RCRA TSDF requirements and Occupational Safety and Health Act (OSHA) requirements in its permanent HHW facility permit requirements. Neither state regulates many specific facility design criteria.

In those states without permanent program regulations, operating practices have been adopted based upon technical assistance from state regulatory officials; operational procedures followed by RCRA TSDFs; knowledge of hazardous materials and waste management of program sponsors and contractors; and upon the examples set by many of the existing permanent facilities around the country. To date, there is insufficient experience to know minimal size and technical design standards necessary for permanent facilities.

OSHA requirements and local building and fire codes also play a role in the final design of the facility. Factory Mutual Research Corporation has certified several pre-fabricated hazardous waste storage facilities for storage of flammable and combustible liquids.

In conclusion, both one-day and permanent facilities are being held in states which may or may not provide guidelines or regulations. Thus far, many operating procedures have been developed by program sponsors based on health and safety concerns, and knowledge of hazardous materials and waste management. As time goes on, a consensus should develop on what design parameters are advisable or necessary for the storage of HHW in permanent facilities.

NEW YORK STATE HOUSEHOLD HAZARDOUS WASTE PERMITTING REQUIREMENTS

Sharon A. Rehder, New York State Department of Environmental Conservation

The household hazardous waste (HHW) program in New York State is conducted by the Bureau of Pollution Prevention of the New York State Department of Environmental Conservation (DEC) in Albany, New York. Although we do not directly provide for the collection of HHW, we offer technical assistance and program oversight to local communities who wish to develop collection or education programs.

New York's hazardous waste regulations follow the USEPA's by unconditionally exempting household waste from the definition of hazardous waste. We have further defined HHW to be,

> Household waste, which but for its point of generation, would be a hazardous waste under Part 371 of this Title, including pesticides as defined in ECL Article 33. (6 NYCRR 360-1.2(b))

All registered pesticides and any waste that would be regulated as hazardous waste if it had been generated by industry are included in this definition. Although it excludes many wastes which are known to be toxic, such as motor oil and antifreeze, most collection programs continue to accept these and other wastes that cause concern without regard to this legal definition. By formally defining HHW, we have a workable tool that determines, at a minimum, which wastes should be included in a collection program. Of course, sponsors may choose to hold a pesticides-only or similarly restricted event. Other definitions considered by the State were less precise and harder to work with than our selected definition.

New York State law does not require individual citizens to segregate or separately dispose of their HHW, nor does it require local or county governments to provide a special collection for these wastes. Several local governments who have established collection programs, however, do require their residents to segregate HHW. A bill pending in the State Senate would require each solid waste planning unit to provide for the maximum feasible segregation and collection of HHW.

Although communities are not required to hold collection programs, those who do are subject to a number of conditions. First, those who wish to hold cleanup days are subject to the following regulations:

> 6 NYCRR 360-1.7(b) Exemptions. The solid waste management facilities identified in this subdivision are exempt from this Part:
>
> (6) The initial site used for the collection of household hazardous waste for a clean-up day or similar event sponsored by a community or governmental organization on a not-for-profit

basis, and designed to assist the public in disposing of unwanted pesticides and other household hazardous waste if:

(i) The sponsoring organization submits a detailed written plan at least 60 days before the date of the event and receives written approval from the regional director of the department's region where the clean-up will take place. The plan must contain at a minimum:

(a) measures to be taken to ensure that all such waste comes from households or farmers, or is a regulated waste exempt from regulation under Part 364 of this Title;

(b) a specific waste determination, segregation, packaging plan, including the identification of qualified individuals who will be present during collection hours to segregate wastes based on their chemical and physical properties and to properly package, label, and manifest the waste for shipment. The individual's qualifications to conduct these activities must be included in the written plan;

(c) a spill prevention and control plan; and

(d) a site security plan, including additional precautions to be taken if wastes are to be stored overnight;

(ii) all wastes are removed from the site within three days of collection;

(iii) wastes are packaged, labeled, and manifested in accordance with the requirements of sections 372.2 and 372.3 of this Title;

(iv) all transportation of the wastes from the collection point is done in accordance with a permit issued pursuant to Part 364 of this Title; and

(v) the requirements of Part 617 of this Title will be met.

The definition of manifest given in our hazardous waste regulations allows the use of non-hazardous waste shipping papers when transporting HHW, provided the wastes are properly labeled and identified. The need to obtain a USEPA generator ID number is therefore eliminated.

This requirement for a written plan has proven to be an effective way for the sponsors of a cleanup day to demonstrate to the State that their program is well-planned and will be a safe and helpful activity for the community. A detailed explanation of these requirements can be found in the publication, Guidelines for Household Hazardous Waste Collection Day Programs, which was published by the DEC earlier this year.

This regulation allows generators who are exempt from Part 364 (the State waste transporter regulations) to participate. Only conditionally exempt small quantity generators, or those who generate and/or store less than 1 kg/month of acute hazardous waste or 100 kg/month of all hazardous waste, are exempt from this Part. However, sponsors usually choose to limit participation to households. A few have allowed farmers, who by an additional exemption may bring up to 1000 kg of pesticide to a cleanup day, to participate.

New York permitted its first permanent collection facility, owned and operated by the Town of Southold, in June of 1988. Southold's application for this permit prompted the DEC to publish Permit Application Instructions for Permanent Household Hazardous Waste Facilities in August of 1988.

Because HHW is unconditionally exempt from hazardous waste regulation, even when accumulated, we are able to permit these facilities under our solid waste management facility regulations, 6 NYCRR Part 360. These regulations, however, do not specifically address permanent HHW facilities. Therefore, all permit applications are judged by the standards set in the Permit Application Instructions. Although it is not as strictly binding as regulations, it sets a consistent standard for evaluating these applications. Seven applications for these facilities are currently pending, but none other than Southold are in operation at this time.

The permanent facility standards were developed to provide many of the same controls that are placed on facilities which store regulated hazardous waste. We feel that this is necessary because HHW, when accumulated, poses many of the same dangers as commercial wastes. However, we have tried to ease the regulatory burden when possible by setting less stringent standards in areas where safety is not directly affected, such as manifesting. Additionally, because these facilities are permitted as solid waste facilities, they are not subject to the State Siting Board requirements. An exemption from the hazardous waste permitting requirements in our hazardous waste regulations for facilities which receive wastes only from conditionally exempt small quantity generators allows us to write the permit to accept wastes from these generators in addition to households.

All permit applications must contain an application to construct, an application to operate (both on forms supplied by the DEC), and engineering plans, maps, and reports, which must be certified by a NYS registered professional engineer. The application must demonstrate to the State that the project is well planned and does not pose any unnecessary risks to workers or the environment.

PERMIT APPLICATION REQUIREMENTS:

Facility Description

A description of the type of facility, its size, features, location, etc., should be provided in the permit application. General operating information, such as whether wastes will be accepted from conditionally exempt-small quantity generators (CE-SQG's) as well as households, hours of operation, volume of waste expected, and frequency of removal, must also be included along with registration forms which are used to document the household origin of the wastes.

Specific Waste Determination, Segregation, and Packaging Plan

The permit application must list all wastes which will be collected and outline appropriate handling, treatment, and disposal options for each.

Wastes which are reactive or incompatible with other wastes on the site must be fully segregated to prevent reaction. No accepted wastes should react with the building shelving, floors, or walls, and a barrier should separate areas of the building which store incompatible wastes. Analytical capabilities must be available if unlabeled and unknown wastes are to be accepted. Plans must also be made to handle wastes which arrive in corroded or leaking containers. A description of the staging area and the procedures that will be followed when wastes are brought to the site must be included.

The type of storage drums which will be used and the storage procedures (i.e. bulking or lab packing) must be identified. The location of specific drums within the building must be shown. Bulking should be done outside of the building, if possible. A detailed log must be kept of all incoming wastes showing the dates, waste type, and quantity arriving from each resident. Packing slips must be attached to each drum which identify each waste inside, the date it was added, and the volume. Wastes should be removed within 90 days of accumulating a total of 1000 kg.

All wastes must be transported by vehicles which have been issued a waste transporter permit by the DEC. The wastes should not be declared to be hazardous wastes, and therefore the use of a State hazardous waste manifest is discouraged. Non-hazardous waste shipping papers may accompany the shipment. Therefore, a USEPA generator ID number is not required. All wastes must be brought to a permitted hazardous waste treatment, storage, or disposal (TSD) facility, unless equivalent arrangements are approved in advance.

Spill Prevention

An emphasis on the prevention of spills and the safe and efficient cleanup of any spills which do occur is an important aspect of the planning for every permanent program. All applications must contain a spill prevention and control plan which contains an outline of preventive and cleanup procedures in detail; an inspection schedule, which must include a daily visual inspection of the area, unless an automatic alarm spill detection system is used; a secondary containment system description; and a list of decontamination equipment for the site.

Contingency Plans

A contingency, or emergency, plan must be developed which outlines each possible type of emergency (such as fire, explosion, or large spill) and describes the actions to be taken in each case. This plan should be of sufficient detail that it may be used as a reference in the event of an actual emergency, and it should be readily accessible on site at all times. It must contain the names, addresses, and work and home phone numbers of those who have authority to take charge during an emergency. It must give locations of phones, alarm systems, water sources, and all emergency equipment. An inspection schedule must be developed to periodically test all facility equipment. These inspections must be recorded in a log which is kept on site.

Arrangements must be made with local officials to coordinate emergency services. Copies of the written agreements made with local ambulance services, hospital, police, and fire departments should be included which describe the circumstances under which the various groups will assume responsibility.

Training

All workers who handle HHW should have the standard 40 hour emergency response training course, although this is not strictly required by regulation. This course helps to ensure that all workers are aware of the hazards involved in their jobs and know how to respond to an emergency. In addition, all workers must have site-specific training which includes emergency response procedures, location and use of emergency and personal protection equipment, recognition of chemical hazards, and proper packing procedures. Each position must have its own training program, and an annual review of training is required. The permit application should list the credentials of the trainer, the topics covered, the frequency and timing of the training program, and documentation procedures.

Other

The permit application must include regional and vicinity maps, a site plan, floor plan, and building details, such as utilities. Traffic patterns on site and the projected impact that facility traffic will have on local roads are important considerations and must be detailed in the permit application. A site security plan must also be included, with fencing and surveillance used to keep both unauthorized people and animals from the site. Warning signs must be used at all entrances to the facility and unauthorized persons must not be allowed access to the waste handling or storage areas.

Finally, facility closure plans must be included in the permit application. The permit application is reviewed by DEC staff, and frequently additional information is required. We expect to receive increasing numbers of applications as the public becomes more aware of the issues arising from household hazardous waste.

REGULATING COLLECTION CENTERS AS HYBRID LARGE QUANTITY GENERATORS

by Nancy Wrenn

On August 27, 1988 the first permanent household hazardous waste collection center was opened in Massachusetts. The Martha's Vineyard Refuse Disposal and Resource Recovery District had been energetically propelled by the inspired Kate Gage, who has made many appearances at these conferences as an advocate of an environmentally protected island and planet. Rather than having to pay the special transportation rates, via ferry, each day there was a collection, the island could now hold the collected waste for a decent sized shipment. Two shipments were taken off island by a licensed hazardous waste transporter during the six month pilot period. Expenses totalled slightly over $50,000, 72% of which was haulers' fees, 10% was attributed to personnel costs and the remainder to promotion and minor supplies. Most materials used to build the center were donated and our state environmental staff provided much of the engineering services, as they developed guidelines for the project. A significant reduction was achieved from the cost of the one-day collections in set-up fees and transportation costs. With this return on our investment --we had developed an 89 page document in granting the Consent Agreement, in addition to a magnificent checklist by Len Pinaud, our regional engineer, who worked tirelessly for months on this "cutting edge"-- we had to capitalize on the model!

At the same time as the Vineyard project was underway, several other initiatives were occurring at the state level. We were meeting with municipal officials to encourage proper management of waste oil collection. These would now need to be attended, not left to the destiny of a casual public. And new solid waste legislation directed us to develop regulations within our hazardous waste program to remove household hazardous waste from the solid waste stream.

The Massachusetts experience, from a regulatory perspective regarding single day household collections, had up to now been"laissez-faire." Some of our inspectors would attend as interested observers. A small grant program had been operating out of our sister agency, the Office of Safe Waste Management, and we had a policy for management of waste oil at solid waste landfills. Waste oil, for the most part, was not carefully managed, but appeared to be a well-used service in the communities we visited. Nearly half of the state's 351 towns had held at least one household collection day since 1982. Probably no more than 50 towns were offering waste oil collection.

In summarizing the Household Hazardous Waste Grant Program Cassandra Goldwater of the Office of Safe Waste Management concluded that funds were needed to suppo**r**t the establishment of permanent regional collections, to explore management options for specific segments of the household hazardous waste stream, such as paints, and that there could be economies if the state expanded its role in administering collections, e.g. seek proposals from hazardous waste management firms that would minimize disposal costs.(1)

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(1) Summary Household Hazardous Waste Grant Program, Fiscal Year 1988 Sept. 1989. Office of Safe Waste Management, Dept. of Environmental Management

In the beginning of the Martha's Vineyard project we saw the handwriting on the wall. A "Collection Review Group" was formed with representatives of each of our four regional offices and the Office of Safe Waste Management to develop consistent procedures for evaluating permanent collections. We came to this process gently, with full realization that we were approaching the NIMBY pitfall of the Hazardous Waste Facility siting nightmare. No hazardous waste management firm had been able to succeed in establishing a new facility in our state although several had tried. We wanted these new creations to spring from grass roots and bloom like cultivated wild flowers.

Furthermore, there was another population of hazardous waste handlers to serve--the Very Small Quantity Generator, who, in Massachusetts, was anyone, other than a household, with less than 100 kilograms of non-acutely hazardous waste a month. The "VSQG" under our regulations could self-transport, if he could find another generator, or facility, which would take his waste. This concept was dying on the vine. No one seemed ready to be quite this generous. We saw the household collection center as an opportunity to bring in the VSQG. Consolidation of these very small amounts into one shipment could be a cost-saving to the VSQG and perhaps provide predictable income for the collection.

The first product of the Collection Review Group was a technical assistance document -- Guidance for Communities Planning Permanent Household Hazardous Waste Collection Centers. (2) It advised setting up several planning committees for siting, (we chose the term "locating"), financing, promoting and legalizing the center and gave an extensive bibliography of resource materials. Cass Goldwater has had dozens of requests for the Guidance and visited a number of communities which are in the early planning stages, or were, before state funds were cut.

In developing this guidance, we tested our concepts: There would be a two-step "approval" process, handled at the DEP Regional Office on a case-by-case determination. The first step would be the location approval. We purposely avoided the use of the word "permit." The center would have to be organized by a city, town or other "body politic." We would not however outlaw a professional hazardous waste management firm from operating the center.

This division of responsibility, in fact, turned out to be the thorniest issue. An operator or transporter can be deemed the generator of the hazardous waste accepted at the center, subject to the approval of the department. This flexibility allows for the most experienced people in the hazardous waste business to assume responsibility until such time as the community has sufficiently trained personnel and/or is willing to be the identified generator. We are still struggling with the long term Superfund liability dark cloud. The mirage may in fact be more threatening than the reality, if a community manages its waste properly.

(2) Guidance for Communities Developing Permanent Household Hazardous Waste Collection Centers, October 1989. Mass. Dept of Environmental Management and Mass. Dept of Environmental Protection.

The first stage of the application process, as stated in the final regulations which we promulgated on September 15 of this year, is obtaining approval of the Department for the proposed location of the collection center. This application shall contain at least a map showing the location which is proposed within a one-half mile radius and "information sufficient to persuade the Department that the presence of a well-designed and well-managed center will not cause significant impact on public health, safety or welfare or the environment or on actual or potential drinking water supplies."

Following this location approval, a formal application is completed. (3) This includes the name of the Organizer, and a Contact Person, the Site Name and Location, the EPA Identification Number (all locations where hazardous waste is stored more than 24 hours are required to file as a Large Quantity Generator), the Designated Operator's name and signature certifying that they have responsibility for notification to EPA, maintaining operating records, filing an Annual Report, signing manifests, and maintaining manifest files, the Designated Hazardous Waste Transporter or Transporters, the Waste Acceptance and Analysis Plan, the physical description of the center, including estimated capacity and types of waste by source, e.g. household and/or VSOG, with a schematic of the storage area, written personnel training plan and security plan, community education plan to promote benefits of hazardous waste source reduction and the use of substitute products, a financial assurance plan to demonstrate capability to carry the operation during the first year, a contingency plan listing local response teams which have been enrolled, and a brief description of how the center would be closed and wastes removed should that be necessary.

You can now see why we call this new phenomenon in our hazardous waste management history a hybrid large quantity generator.

We have copies of our regulations available for you, as well as the application form. Although they take up only three pages in our 450 page volume, they have cross references into the main body of the regulations, which specify requirements in much more detail.
(4)

(3) Application, Collection Center for Hazardous Waste from Households and/or Very Small Quantity Generators, Mass. Dept. of Environmental Protection, Bureau of Waste Prevention, Division of Hazardous Waste.

(4) Mass. Hazardous Waste Regulations 310 CMR 30.390: Special Provisions for Accumulation of Household Hazardous Waste and/or Hazardous Waste Generated by Very Small Quantity Generators

PERMITTING PROGRAM IN CALIFORNIA

by

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I am very happy to be here today and to have the opportunity to discuss the future permitting requirements for household hazardous waste facilities in California. Let me start by telling you a little bit about the household hazardous waste management program as it is today in California.

California, as you know, is physically a very large state, with 58 counties and 453 incorporated cities. At present, there are only five counties in California where permanent household hazardous waste collection facilities have been established. There are actually 10 permanent facilities operating in California right now, but 5 of them are in one county, San Bernardino, and 4 of the 5 are operated by cities within that county. The current listing of permanent HHW collection facilities is as follows:

	County	Facility Operated By
1.	Los Angeles	City of Santa Monica
2.	Monterey	Monterey County
3.	San Bernardino	City of Barstow
4.	San Bernardino	City of Rancho Cucamonga
5.	San Bernardino	City of Redlands
6.	San Bernardino	City of Victorville
7.	San Bernardino	County of San Bernardino
8.	San Diego	County of San Diego
9.	San Diego	City of Coronado
10.	San Francisco	City & County of San Francisco

In addition, there are periodic (one-day/one-time) HHW collection programs held throughout the State by both cities and counties too numerous to specify. But all totalled, programs and facilities currently exist in only 25 counties in California - less than half of the counties in the State! But that is changing rapidly, I'm happy to say. And it's changing because of several things that have occurred during the last 2 or 3 years.

First of all, there is a greatly increased awareness of hazardous waste in general, and household hazardous waste in particular. This is due in part to an increasing awareness on the part of the public in general, but it is also due, in

California, to the Tanner planning process - that is, the development of county hazardous waste management plans authorized by AB 2948 which was authored by Assemblywoman Sally Tanner. This legislation requires these county hazardous waste management plans to: (1) identify the types and amounts of hazardous waste currently generated in each county - including household hazardous waste; (2) estimate how much will be generated in the year 2000; (3) identify how these wastes are being managed now or how they should be managed; and (4) assess the potential for waste reduction.

I don't want to get sidetracked on the Tanner planning process, but for many counties in California, this planning process has been invaluable as far as educating the counties themselves about the hazardous waste in their own backyards. I've been told that as recently as three years ago there were still counties and county officials in California who believed that there was no hazardous waste in their county and that they had no problem! I think it's safe to say that no one is able to say that today!

But as a direct result of the Tanner planning process, almost every county in California and many, many cities are planning, for the first time, to conduct a HHW collection program. And many of the communities that were already conducting periodic HHW collection programs are now transitioning to permanent HHW collection facilities.

Another major factor is the recent passage of another piece of legislation, AB 888, authored by Assemblywomen La Follette, Eastin, Killea and Tanner. This new law requires that after January 1, 1990, all county solid waste management plans shall now include a program for the collection, recycling and disposal of household hazardous waste. Subsequent implementation of these programs is also required.

Up until now, the California Department of Health Services (Department) has followed one of two practices in permitting or authorizing household hazardous waste facilities and programs: full permits for permanent facilities and variances for the periodic (one-day/one-time) collection events. But with the heightened awareness regarding HHW and the increasing numbers of both periodic and permanent HHW programs and facilities, the Department has recognized the need for a more efficient procedure to issue permits to and for these programs.

As a result, the Department has developed a program, the Permit Streamlining Program (PSP), to respond to the permitting needs of the many facilities in California handling Non-RCRA or California-only wastes, such as household hazardous waste programs. Such wastes, unless properly regulated, do pose a potential for significant risk to public health and the environment.

In addition to addressing potential health risks, PSP was designed to: (1) significantly reduce the permitting backlog which exists in the State's hazardous waste program; (2) to expedite the permit decisions which need to be made; (3) and to optimize the use of existing State resources. PSP was also instituted to ensure a more equitable approach in the way State-only facilities are taken through the permit process.

PSP considers three permitting options: (1) Permit By Rule (PBR); (2) Standardized Permit; and (3) Individual Permit. The options being considered for household hazardous waste management programs are Permit by Rule and Standardized Permit.

Permit by Rule. Permit by Rule is the simplest approach and is intended to be used on those types of facilities where the processes and wastestreams are fairly consistent, and where the waste management practices are generally "low-tech", well understood and routine. Facilities regulated under Permit by Rule will only need to comply with specific regulatory conditions that will soon be adopted into regulation by the Department. The envisioned regulations will require prior notification to the Department to, in essence, allow a facility to "permit" themselves and commence operations. Under this approach, the Department will conduct post-start-up inspections of facilities either while they are operating or after they have been conducted, rather than attempt extensive review of their proposed operations prior to start-up.

Standardized Permit. The Standardized Permit approach is intended to be used on those groups of industries whose operations do require a degree of review by the Department prior to permit issuance and start-up, but whose waste management practices are similar enough that we would expect to see very similar operation plans for different facilities. Under this approach, the Department facilitates the permit applicant's work by providing them with detailed guidance on how to prepare an acceptable operation plan - literally a "fill in the blanks" model operation plan. This type of detailed guidance will significantly shorten the time it takes an applicant to complete their permit application, and it will also greatly simplify the Department's review and approval of the application. In addition, the Department will develop a standardized permit which will be used in all of our Regional Offices and will provide for rapid, consistent permits.

As a result of the PSP process, the Department has determined that one-day/one-time HHW collection events should be authorized under Permit by Rule, and regulations have been drafted. These regulations could be adopted as early as mid-summer of 1990.

The Department has also determined that permanent HHW collection facilities should be authorized under Permit by

Rule. Regulations are being drafted and could be adopted by the Fall of 1990.

Draft Permit by Rule Regulations for One-Day/One-Time Events: The draft PBR regulations for one-day/one-time HHW collection events currently contain approximately 55 requirements. The draft regulations are broken down into seven "sections"; each section contains the regulatory requirements for a particular "subject area" as follows:

- Location, Traffic, and Layout
- Participants and Waste(s) Accepted
- Waste Handling Procedures
- Emergency Planning and Response
- Notification and Reporting
- Sponsor, Facility and Personnel
- General Operating Standards

The regulations regarding location, traffic and layout will, of course, address the requirements and restrictions for where a one-day/one-time HHW collection event can be held (50 foot buffer zone required), how traffic is routed through the event (one-way direction only) and how the "facility" for the event is designed (separate areas for waste receiving and acceptance, HazCatting, bulking, etc.).

The regulations regarding participants and waste(s) accepted address who can and cannot bring waste to the HHW collection event (local residents), which waste(s) can and cannot be accepted (no compressed gas, reactive, explosive or radioactive wastes).

The regulations regarding waste handling procedures obviously will address the requirements to ensure that all wastes are handled properly (sorted for compatibility, packaged and labeled correctly, removed within 144 hours, etc.).

The regulations regarding emergency planning and response will address the requirements for emergency support agency notification(s), contingency plans, evacuation routes, etc.

The regulations regarding notification and reporting will address the requirements for obtaining one of the special EPA identification numbers, obtaining all necessary prior approvals from all local agencies, and notifying the Department 30 days in advance of the HHW collection event.

Let me digress for just a minute to talk about the special EPA identification numbers we now issue for HHW collection facilities and events. Because HHW collection facilities and programs operated by local government agencies are exempt from all facility and generator fees, the Department is now issuing special I.D. numbers for these programs. The numbers, which can only be issued to a local government agency, instantly identify the program as a HHW program, and the "coding" of the numbers prevents them from being submitted to our State Board of Equalization for billing. These special numbers have a "CAH" prefix - the "CA" meaning California, of course, and the "H" indicating a HHW program. The numbers further distinguish between one-day/one-time collection events and permanent facilities as well. Numbers beginning with CAH 111 xxx xxx are assigned to permanent HHW facilities; numbers beginning with CAH 777 xxx xxx are assigned to one-day/one-time HHW collection events.

The regulations regarding sponsor, facility and personnel will address the requirements to be met for a local government agency to function as a HHW collection event sponsor, minimum training standards for personnel, liability coverage needed, etc.

And the regulations regarding general operating standards will address the requirements for maintaining the site, securing the area, posting signs, etc.

The logistics for how all of this will actually work are still being determined. But as we envision it, one scenario is that the sponsor of the HHW collection event, i.e., the local government agency, will plan the event, hire a contractor, obtain ALL necessary local approvals and then send a notification and certification to the Department at least 30 days in advance of the HHW collection event. The notification will include the date, time and location of the event, and the certification will state that the sponsor of the event will comply will all of the regulatory requirements. Two copies of this notification/certification will be submitted to the Department; they will be date stamped "received", and one copy will be returned to the event sponsor. Another possibility is that the notification and certification will be provided to the Department at the time the special I.D. number is applied for and obtained. In either case, after the event, the sponsor will be required to submit an exception (or incident) report to the Department to report ANY and ALL unexpected occurrences, i.e., problems of any sort such as prohibited wastes being brought to the event or incompatible wastes being inadvertently mixed, etc. I think you can understand why we need to and want to know about any and all incidents.

There is one final, but very important thing I must mention about these one-day/one-time events and Permit by Rule. If, for any reason, the local government agency planning and sponsoring the one-day/one-time HHW collection event cannot comply with ANY of the regulatory requirements, the agency will still have to apply for and obtain a variance from the

Department. This means that if the site chosen will provide something less than a 50 foot buffer zone or if the waste cannot be removed within the specified time limits, etc., then a variance will have to be issued before that one-day/one-time HHW collection event can occur.

Now let's talk about permanent facilities.

Since the Department intends to utilize Permit by Rule for permanent HHW facilities, the procedure will be similar to what I have just described. However, it's possible (although unlikely) that we may require the facility to undergo and pass an inspection before operations can begin; such standard requirements as submitting financial responsibility documentation (for both closure costs and liability coverage) prior to start-up will undoubtedly be required.

Our intent is for the new Permit by Rule procedures to provide an efficient and effective permit process. We believe this new approach will be advantageous in facilitating community service collection events; it will also provide continued protection of public health, safety and the environment.

THE MINNESOTAN PERSPECTIVE ON HOUSEHOLD BATTERIES

by Nancy Misra

INTRODUCTION

The Minnesota Pollution Control Agency (MPCA) began conducting household hazardous waste collections in partnership with local governments in 1985. Recently, the household hazardous waste unit has received inquiries - from local governments, businesses and private citizens - asking about the proper method to dispose of their waste batteries. Each disposal situation is different since in Minnesota municipal solid waste may either be incinerated, composted or landfilled, and the batteries requiring processing or disposal vary in type and quantity. Thus, the MPCA felt a need to thoroughly research the impacts of battery disposal prior to developing a statewide battery program. In July the Legislative Commission on Minnesota Resources (LCMR) gave the final approval for a two year battery study to be conducted by the MPCA.

LEGISLATIVE PROCESS

Minnesota's interest in household battery collections is fairly new, although this interest has grown tremendously over the past year. In 1988, the MPCA raised the issue of household battery management, particularly for nickel-cadmium batteries. It became apparent that the public's concern about household battery disposal encompassed the full range of household battery types.

Minnesota has a rather unique body, the Legislative Commission on Minnesota Resources. This is a group of Minnesota State legislators who award funds for research projects which address resource use or management issues in Minnesota. In 1988 this Commission became interested in household batteries and eventually authorized the study which we are conducting. Over the course of the process which led to this authorization, many complex issues regarding household battery management surfaced. Clearly there was a wide variety of opinions regarding what is safe, effective, and realistic when considering battery collection programs. The emphasis of our study soon shifted from simply researching nickel-cadmium battery collection mechanisms to researching the feasibility of collections for various battery types. Due to the wide variety of battery types and their varying metals composition, we're finding our task to be considerably more complex than initially planned. The research project also encompasses evaluation of available processing and disposal options.

DILEMMA

Physically, batteries seem a logical item to target for collection - they contain heavy metals, and yet are easy to handle: being small and packaged in a solid form as opposed to a liquid one. Lately, Minnesota cities and counties have been asking the MPCA for recommendations on how to collect spent batteries. Some counties in Minnesota have started battery collection programs chiefly as a result of having waste to energy facilities. (A representative from Hennepin County will make a presentation about their collection program later in this conference.)

The dilemma of battery collection involves balancing the need for action as perceived by the citizens against the lack of information on the total environmental and human health impacts. The relatively easy response of authorizing battery collections within the existing household hazardous waste collection program may not be the correct solution. Thus, issues that the MPCA will address in this battery study, as well as the proposed investigative method, are as follows:

1. How much of a problem do batteries pose for disposal in landfills, incinerators and compost facilities? Minnesota has 12 operating waste to energy facilities (with a 13th to start any day), two municipal solid waste composting facilities (with another nine under development) and approximately 90 landfills built over a variety of soil types. Industry is providing battery sales figures and the LCMR study is researching the fate of batteries in the different facilities, but additional information is needed.

2. Do certain batteries pose more of a problem for disposal than others? Early studies indicate mercury batteries in incinerators may cause elevated mercury emissions, while cadmium may accumulate in the incinerator ash when nickel-cadmium batteries are burned. The LCMR study will attempt to determine how much heavy metal batteries contribute to the municipal solid waste stream. The results will be further broken down by battery type and disposal situation.

3. What are the management options? Are these options justifiable in terms of economics, or the potential for harm to the environment or to the worker at the disposal or processing facility? The LCMR study is trying to balance the environmental and health threats associated with batteries and the total cost of their disposal.

4. What disposal options are available if batteries are collected? Is there any potential for technology transfers? This information will be gathered through a literature review and an investigation of domestic companies which claim to be household battery recyclers.

5. What are the safety issues associated with collecting and handling spent batteries in large quantities? The LCMR study is working with representatives from the battery industry and poison control centers to answer this question.

6. How do the various management options fit in with the existing household hazardous waste regulations? The LCMR study is working within the MPCA on this issue.

BATTERY STUDY

The LCMR battery project is funded from July 1989 to 1991. The basic thrust of the project is to research which batteries are of the greatest environmental concern statewide, to explore and develop feasible battery management options, to identify appropriate safety precautions and to develop educational material. A secondary thrust is collection of those battery types for which there is a perceived environmental or health threat and for which there are viable processing options. A final thrust is to create a data base from this information to share with other natural resource planners.

At this point in time, only the research efforts have been started. Two separate review groups are in the process of being formed - one would provide review for the entire project and is formed entirely of MPCA staff, while the other is a group consisting of industry, environmental and local government members who have been asked to review and comment on the research phase of the battery project. These advisory groups will have their first meetings this month.

The battery study will produce two products. The first is an interim report that will contain:

1. The results of the LCMR funded laboratory metals composition tests;
2. The literature search on why batteries are a problem;
3. A discussion of the existing processing options (i.e., developed from researching/visiting the current recycling companies); and
4. How the assorted battery management schemes might fit into the existing Minnesota hazardous waste regulations, and specifically how they would merge with those on household hazardous wastes.

The final report will encompass the findings from the interim report, the more extensive total metals composition test results soon to be conducted by Recoverable Resources/Boro Bronx 2000 of New York, and a feasibility analysis of the various management plans discussed in the interim report. By July 1991, these management feasibility studies will have been presented as recommendations to the legislature.

CONCLUSIONS

In trying to formulate realistic policies for dealing with household waste batteries in all the different combinations of quantity, type and disposal variables that are possible across the State, several items are apparent even in these, the beginning stages of research. First, although problem definitions are crucial to the development of regulatory strategies, each county's problem is different; no one option will satisfy every counties' needs. For example, the collection option may not be appropriate in rural counties whose household waste is going to landfills yet be proper in counties with incinerators. Another management option - ruling waste batteries as hazardous - pretty much narrows their disposal options down to using out-of-state hazardous waste landfills or permitted recycling companies. A subquestion then is whether battery disposal is a legitimate use of scarce hazardous waste landfill space. Second, more research needs to be done. Too many questions are unresolvable at the present time. For example, is recycling possible for all battery types? Exactly how successful has industry been at reducing the amounts of mercury in their products? What are the health implications associated with the various disposal options? How are other countries handling their household batteries? More data in these areas would certainly help the State of Minnesota as well as the other states that are or will be grappling with these issues in the future.

STATUS OF HOUSEHOLD BATTERY COLLECTION PROGRAMS IN THE U.S.

Marie Steinwachs, Asst. Director, Household Hazardous Waste Project, Springfield, MO

Problems of Batteries in the Solid Waste Stream

Many communities are looking for ways to reduce the metals in the waste stream. Fly ash and bottom ash from municipal incinerators have shown excessive levels of heavy metals which may require special handling and landfilling. A signficant amount of mercury vapors have been measured from incinerator emissions[1]. Studies in Quebec have shown that there may also be a correlation between the emissions of copper, cadmium, and zinc with the emissions of dioxins, furans, chlorobenzenes, and chlorophenols[2]. Though adequate studies have not been conducted on the effects of batteries on landfills, many communities are concerned that batteries will corrode over time and release the metals into the environment.

Batteries are major contributors of heavy metals in the solid waste stream. Americans own an estimated 900 million battery-operated devices and use approximately 1.6 billion batteries per year to power them. It is estimated that nearly half of all the mercury used in in this country is used in batteries[3]. Batteries account for 54% of the cadmium and 65% lead in the solid waste stream[4]. Analysis of solid waste conducted in 1987 by Bill Rathje and Doug Wilson of the University of Arizona's Garbage Project, found batteries to be the most numerous hazardous waste type in household garbage. Batteries and electrical (which included auto batteries and solder), comprised 29.9% of New Orleans household hazardous waste, and 48.8% of Marin County's (by weight)[5].

Efforts to reduce the volume of solid waste are complicated by the existance of batteries in the waste stream. In the case of incinerators, heavy metals become concentrated in the ash in direct proportion to the degree of volume reduction achieved[6]. New technologies such as municipal solid waste composting or refuse derived fuel will also face concentration of heavy metals if batteries are not first removed. The "solid waste crisis" has made apparent the need for special handling of various problems components of the waste stream, including household batteries.

An Overview of Existing Battery Collection Programs

Southwest Missouri - The Household Hazardous Waste Project contacted by phone all jewelers, hearing aid stores, and pharmacies in southwest Missouri to see if they would accept them from the public. Approximately fifty outlets were identified in twenty three counties. Those who agreed to participate in our program were listed on a widely-distributed recycling list which included as many non-hazardous and hazardous materials as could be recycled in our area. No data was collected to determine the success of the program though there was good media coverage and increased phone calls regarding batteries. [Contact Marie Steinwachs, HHWP, 901 S. National, Box 108, Springfield, MO 65804 (417) 836-5777]

New York City[7] - The Environmental Action Coalition in New York City began first with button batteries. They sent out collection boxes and educational materials to 180 stores. In six months they received about 100 lbs. of batteries which were sent to the Mercury Refining Company. EAC expanded their program to include a collection for all types of batteries in a 1200 unit apartment house. In just a few months, they had collected 900 lbs. of batteries. For the past four months, EAC has slowed down their collection efforts because of reported troubles at the Mercury Refining Company. EAC has just received a grant for expansion and continuation of the battery program. Part of the program will be directed toward finding out what to do with the batteries. [Contact Timothy Forker, Environmental Action Coalition, 625 Broadway, NY, NY 10012-2611 (212) 677-1601]

New Hampshire/Vermont [8]- The NH/VT Solid Waste Project was one of the first battery collection programs in the country. The Project continues to collect all types of batteries in plastic buckets at town offices and retail stores and pack them in 55 gallon drums. Six drums weighing between 600 and 800 pounds each were collected by June, and four more drums by September of this year. The batteries are sent to a GSX hazardous waste landfill in South Carolina. [Contact Carl Hirth, NH/VT Solid Waste Project, Moody Bldg., Claremont, NH 03743 (603) 543-1201]

Washington State[9] - Thermal Reduction Company in Bellingham, Washington began a button battery collection last year. In April 1989, the program was expanded to include all household batteries. Fifty local merchants have participated in collecting over 800 lbs. of batteries to date. The company has a commitment to remove batteries from the solid waste stream and would like to expand the program. They do not currently have an outlet for the collected batteries, and are storing them until a market can be found. [Contact

Lisa Schnebele, Thermal Reduction Company, Inc., 1524 Slater Rd., Bellingham, WA 98226 (206) 384-1057]

Minnesota[10] - The model battery collection program in the country is Hennepin County, Minnesota. In 1985, the county contracted for the construction of a 1,000 TPD incinerator. Under the contract, the county must strive toward removing hazardous wastes, including batteries, from the solid waste stream. To achieve this, they have tried different methods of collecting batteries and have kept excellent data on their results of these pilot programs. The community of New Hope was chosen for a retail collection program. Thirteen stores agreed to serve as collection points. The county then provided them with buckets, posters, and advertising. The Optimists Club agreed to collect the batteries from the retail outlets in exchange for all the button batteries obtained through the county program. Collected batteries were taken to the County Vocational Services for the Handicapped where they were sorted, counted, and weighed by composition type. During the first six months, about 67-1/2 lbs. of batteries were collected. In the second six months, approximately 108 lbs. of batteries were collected.

A pilot curbside battery collection was conducted in the town of Golden Valley (demographically similar to New Hope) in conjunction with their curbside recycling program. Collection dates were chosen in February, following the Christmas battery peak, and in June. An educational campaign was implemented by the county in the selected area. Residents were instructed to put batteries in a zip-lock bag or a clean plastic milk jug and a bright sticker was provided to mark the container. On the designated days, residents were to place the marked container on top of the bin of recycled materials, with the sticker in full view. During the first pickup, 300 lbs of batteries were collected from 245 households (an average of 11 batteries or 1.22 lbs per household). Ninety four percent of the batteries were alkaline or zinc/carbon, three percent were ni/cads or button batteries. During the second pickup, 404 households participated, putting out an average of 16 batteries per household.

The county has permission to store collected batteries for up to one year in a concrete bunker on county property. The batteries are sorted into five categories: zinc/carbon, alkaline, nickel/cadmium, mixed button, and miscellaneous. Each category is contained in its own 55 gal. polyurethane barrel and marked as hazardous corrosive material. They are measuring the mercury vapor emissions from the stored batteries. Alkaline batteries stored for up to three months had the highest concentrations of mercury vapors (0.5 mg/cubic meter). As soon as the barrels were opened, this mercury vapor dissipated into the storage area, indicating a potential for battery handlers to be briefly exposed to high levels of mercury vapors. These tests may show a need for special ventilation and handling for long-term storage of batteriess. [Contact Donald A. Seeberger, Div. of Environment and Energy, Hennepin County Dept. of Public Works, 822 South Third St., Suite 300, Minneapolis, MN 55415]

Obstacles and Questions to Ask When Considering a Collection Program

1. There is a great lack of public awareness that batteries contain hazardous materials. At the same time, there is a large and growing number of batteries in use. In general, the public cannot distinguish between the types of batteries.

- How will you educate the public?
- Will you focus on reduction of battery use or on collection only?
- How will you fund the education program?

2. Collection containers must be able to contain possible corroding batteries (ideal are plastic buckets, plastic bags, minnow buckets, or plastic lined cardboard boxes). A small opening in the top will allow less vapor emissions, and yet make in difficult to insert the larger batteries. Collection boxes or buckets will require periodic maintenance. The more convenient it is for people to participate, the more participation.

- Will you collect all types of batteries?
- Where will you have your collection containers?
- Who will maintain the program?
- Will you sort the battery types? Who will do the sorting, and where?
- Will you keep records?
- Where will you store the batteries collected? In what? For how long?
- How will you fund the collection?

3. The weakest link in battery collections is the lack of markets for the batteries. As apparent from the programs in operation, most of the collected batteries are either stockpiled or shipped to hazardous waste landfills. The reason for this is the issue of long-term liability. The companies that are currently offering to take all types of household batteries are sending some to overseas companies or to

hazardous waste landfills. Before you select a company to send your collected batteries to, ask the following questions:

- What is their environmental track record?
- How do local and state officials view the company?
- How long have they been in business?
- Who else has sent batteries to them?
- What is the process that each type of battery goes through when it reaches the plant?
- If batteries are sent overseas, then where? What is that company's track record, etc.?
- Where do non-marketable batteries and processing waste go to?

Have an attorney go over all contracts before signing them to make sure that you are not accepting an enormous potential for liability. Visit the plant, and talk personally with plant representatives and local officials.

Looking Ahead

Interest in collecting batteries in this country is higher than ever before. Household batteries create special technological problems for recycling because of their small size and the small amount of marketable metals contained in each. There is not financial incentive for companies to develop and expand their technology unless something happens which changes the economics, for example, the prohibition of household batteries in landfills and incinerators which is being considered for lead acid batteries. It is possible that those in the best position to recycle household batteries are the ones who manufacture them. Pressure needs to be put on these companies to become involved in the solution.

The First International Seminar on Battery Waste Management in Deerfield Beach is meeting at the same time as this conference. The seminar is covering the current status and trends of battery waste issues, regulations and planned actions, both governmental and industrial, in the U.S., Europe and Japan. Labeling, collection, and recycling will be examined from economic and technical viewpoints. [To obtain the proceedings, contact Dr.Sumner P. Wolsky, President of Ansum Enterprises, 2836 Banyan Blvd., Cr. NW, Boca Raton, FL 33431 (508) 338-7096]

Another development is a study proposed by David Hurd, formerly of Environmental Action Coalition; and Connie Leach, formerly of the NH/VT Solid Waste Project. They have raised almost all of the estimated $140,000 budget for the first phase of the study.

They propose to conduct an independent analysis of the composition of each type of battery, and determine the potential for separating and marketing the components. The second phase will be to develop an actual plant to recycle the batteries. They are also working with Poloroid Corporation to develop a recycling process for the "Polapulse" battery that comes in film packs. David is also trying to set up a clearinghouse for battery information. [Contact David Hurd, South Bronx 2000 Local Development Corporation, 1809 Carter Ave., Bronx, NY 10457 (212) 731-3931]

At Carnegie-Mellon University in Pittsburg, thirty engineering and social science students are researching household batteries. They are attempting to determine how large a problem household batteries are by looking at market projections, composition and decomposition of batteries. Leachability is being studied using crushed and uncrushed batteries and various types of landfill liners. The students are reading a number of related studies and inviting in speakers with expertise on battery manufacture, recycling, and landfills. They are investigating the potential for recycling and redesign of batteries, and they are also looking at policy recommendations that would provide incentives for battery recycling. These students will publish their results on Dec. 7 and hope that the report sparks further scientific and public interest in batteries. [Contact Indira Nair, Dept. of Engineering and Public Policy, Carnegie-Mellon University, Pittsburg, PA 15213]

Finally, Hennepin County, Minnesota is now applying for a grant to set up a program where rechargeable appliances will be collected at certain retail stores, back-hauled to regional distibutor warehouses, and then taken to the sheltered workshops where the ni/cad batteries will be removed.

During the next year, communities considering battery collection should proceed cautiously. Collecting batteries for long-term storage in may not be a good solution. It may be wiser to begin with button batteries for which there is a market for the metals. A public education campaign starting before Christmas to encourage consumers to avoid purchasing battery-powered gifts would begin to generate pressure on the battery industry and develop support for future policies or programs.

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SPEECH OF DONALD WOJTON FOR THE EPA CONFERENCE ON HOUSEHOLD HAZARDOUS WASTE MANAGEMENT

Good afternoon, I am Donald Wojton, Vice President of Manufacturing Services for East Penn Manufacturing, headquartered in Lyon Station, PA. East Penn Manufacturing produces automotive and industrial lead batteries and operates a secondary lead smelter. I am speaking to you today as a representative of the Battery Council International's ("BCI") Environmental, Government Relations and Industrial Health Committees.

First, allow me to provide some background on BCI. BCI has over 250 member companies from throughout the world. BCI's members are engaged in the production of lead storage batteries for automotive, marine, industrial, stationary, specialty and commercial uses. BCI's members also include companies engaged in the reclamation and recycling of lead batteries once they are spent. BCI represents more than 99 percent of the nation's domestic lead battery manufacturing capacity, and approximately 92 percent of its battery recycling capacity. BCI includes all the large, multi-plant domestic manufacturers as well as the majority of the nation's smaller firms.

BCI primarily was established to help set industry standards, and the like, for lead batteries. In 1987, however, the Battery Council expanded its focus to include the active promotion of lead battery recycling.

As you may know, lead batteries are used for starting, lighting and ignition systems in automobiles, other vehicles, and marine systems; to power computers and household tools; and in a variety of industrial applications.

In 1988, approximately 80 million lead batteries were sold in the United States for these and other uses. Lead battery usage also is growing. This is due to the increasing consumer demand for electric devices, the fundamental relative efficiency of this power source and, we believe, the recyclability of our product.

Historically, the lead battery industry has relied upon the use of recycled lead in the manufacture of new lead batteries. The primary source of this lead is used or junk lead batteries. A typical battery is made of a recyclable plastic casing, reclaimable lead plates, and potentially reusable sulfuric acid. The technology and markets exist today to assure that these products are and continue to be recycled.

There already exists a sophisticated and voluntary battery recycling infrastructure. Typically, lead batteries are returned by customers to battery retailers or service stations.

Battery manufacturers, recyclers or scrap dealers then pick-up the used batteries and take them to secondary lead smelters for recycling.

At secondary smelting facilities, the batteries are separated into their component parts -- plastic, lead plates, and sulfuric acid. The acid is collected and either reused or neutralized. The plastic is removed from the outside of the battery and chipped into pieces and sold for recycling into such products as new battery cases. The lead plates and associated materials are smelted and refined into new lead ingots. The refined lead is then used to make new batteries and for other purposes.

As I noted earlier, a specific battery recycling rate is difficult to determine. However, the Environmental Protection Agency stated in two recently-released reports ("The Solid Waste Dilemma: An Agenda for Action" and "The Sources of Lead and Cadmium in the Municipal Waste Stream, 1970 to 2000") that currently 80 percent of the spent automotive lead batteries are recycled. Based on the experience of our members, BCI believes the actual current battery recycling rate may significantly exceed that level.

Whatever the precise number, however, it is obvious that the recycling rate is high. Indeed, at 80 percent, the rate of lead battery recycling is 50 percent greater than aluminum cans and five times greater than glass bottles.

Nonetheless, some modest percentage of batteries now do escape recycling, or in the future may escape it. To address this concern BCI is actively promoting legislative initiatives that would encourage battery recycling without imposing undue costs on consumers, manufacturers, distributors or retailers.

In part, BCI has responded to increased legislative emphasis on promoting and mandating recycling. In late 1987, for example, BCI learned that Rhode Island passed legislation which mandated the recycling of lead batteries. This legislation, as enacted, would have imposed onerous requirements on an existing battery recycling infrastructure that already was producing a high recycling rate. BCI, however, was successful at educating the Rhode Island legislators so that the requirements were modified to better reflect the nature of the battery manufacturing and recycling business.

Based in part on that experience, BCI in 1988, developed -- and is continuing to advance in States throughout the country and at the federal level -- model battery recycling legislation.

The key concept underlying this model legislation is that the current battery recycling rate, be it 80% or higher, is based on a sophisticated and voluntary battery recycling infrastructure. Currently, however, not all of our nation's lead battery retailers actually take back used batteries. To be most effective, therefore, legislation should focus on the remaining percentage of batteries not being returned to the system.

Therefore, BCI recommends accomplishing this goal by requiring all persons who sell lead batteries to take back used batteries, and educating consumers that batteries are recyclable, that it is illegal to throw batteries in the trash, and that dealers are required to take back their used batteries. Specifically, the key components of BCI's model legislation are:

- A prohibition on the land disposal or incineration of lead batteries;
- A requirement that all persons selling lead batteries post signs at their establishment(s) that state:
  - It is illegal to discard lead batteries;
  - Recycle your used batteries; and
  - State (or Federal) law requires us to accept used motor vehicle batteries or other lead batteries for recycling in exchange for new batteries; and
- A requirement that used batteries be recycled by being delivered to a battery retailer, wholesaler, or manufacturer (or agent of such a person) for delivery to a secondary smelter, or to a battery collection or recycling facility authorized by the state or by the U.S. EPA.

Since 1987, battery recycling legislation has been enacted in thirteen states and one county. These are: California, Florida, Hawaii, Illinois Louisiana, Maine, Minnesota, North Carolina, Oregon, Pennsylvania, Rhode Island, Washington, Wyoming and Suffolk County, New York. Ten of these states have imposed requirements virtually identical to the BCI model.

As a practical matter, however, BCI believes that adoption of piece-meal state requirements is unnecessarily burdensome on the industry. Even though legislators have ultimately adopted requirements similar to those outlined in BCI's model, this has not come without significant effort by the industry to educate legislators about the nature of the battery business. A national approach to this issue is far preferable, for it is the least costly and most effective way to achieve and maintain 100 percent battery recycling.

Moreover, battery distribution is a classic issue of interstate commerce. Lead batteries are produced for national or regional, rather than state-by-state, distribution. When different states impose different requirements -- even seemingly innocuous differences, such as product labelling obligations or battery deposits -- significant disruption in distribution results which raises costs to the battery manufacturing industry and, ultimately, to consumers.

In some instances the increased costs simply can not be justified. For example, with regard to battery labeling, the average life of a lead battery ranges from three to five years. It is highly unlikely that after a battery expires consumers will be able to read a battery label. Junk batteries usually are very dirty, covered with grease and grime. A better alternative to communicating recyclability, in BCI's view, is to require retailers to post point-of-sale signs that educate consumers of the requirements, and that batteries are recyclable.

BCI also does not believe deposit requirements are useful or necessary to increase the battery recycling rate. Battery deposits do not provide much incentive for recycling: given the average lifespan of a battery, it is unlikely a consumer will remember to reclaim his or her deposit three to five years after the purchase of a battery. Deposits impose real and unnecessary costs on consumers and retailers -- as much as a 20% de facto excise tax -- and they often trigger extensive recordkeeping and reporting obligations. Significant governmental resources can be required as well to develop regulations, manage the records required to be submitted to the state, and supervise the handling of funds.

One form of deposit that has received attention in several states is a deposit in lieu of a trade-in. This system requires consumers to pay a certain price in addition to the price of a new battery if they do not have a used battery to offer in return. Although this is more desirable than a deposit on all batteries, BCI does not believe that even this type of deposit is necessary to close, and keep closed, any recycling gap. Of the thirteen states with enacted legislation, only three have imposed this type of deposit.

BCI understands, however, that regardless of the legislation, today, waste haulers and landfill operators are finding some lead batteries in the waste stream. BCI wants those batteries returned to the recycling chain. BCI strongly encourages both waste haulers and landfill operators to set the batteries aside if and when they are found, and contact a secondary smelter to pick the batteries up for recycling. (Show transparency with the list of secondary smelters.)

This is a list of all the domestic secondary smelters and their locations, a copy of which also is available in the front of the room.

There are additional systems for ensuring that batteries do not enter the municipal waste stream. For example, the city of Milwaukee, WI has designated community drop-off centers for lead batteries which are picked up by a battery manufacturer and taken for recycling. Additionally, some solid waste haulers in the Reading, PA area use trash trucks with simple compartments for lead batteries. This allows for the separation and management of lead batteries at the curbside.

BCI will continue to advance the imposition of mandatory battery recycling requirements at both the state and federal level, and encourage the implementation of programs such as those I have just described. BCI supports requirements and programs that close whatever gap remains in the recycling chain, and that accomplish this goal efficiently and at the least cost to battery manufacturers, distributors, retailers and consumers.

Thank you for asking me to speak here today. I would be happy to answer any questions you may have.

THE WHY AND HOW OF HOUSEHOLD BATTERY COLLECTION

PRESENTED BY DAVID COHEN, VICE PRESIDENT
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There are people who don't believe that household batteries should be collected. They ignore dozens of studies and reports about the potential environmental hazards of their improper disposal. The environmental degradation is not a potential threat, it is going on at this very minute. The majority of the resource recovery facilities in the United States are incinerating household batteries, an item that is 98% non-combustible. In addition, unlined municipal landfills are accepting household batteries everyday. I am going to tell you about some of those studies today to make sure that there is no question left in your mind whether household batteries should be collected and then I will tell you a little bit about what we can do to help you.

Let me make one or two points before we talk about the studies. Household batteries should be handled in an environmentally sound manner. But this is not to be confused with recycling. Recycling is great. We should try to recycle as much as we can while it still makes sense. But not everything can be recycled at rates that make sense. Recycling is not the real focus here though. The most important reason for collecting household batteries is to reduce the toxicity of the municipal waste stream going to landfills and especially to municipal incinerators. Household batteries when handled improperly present a threat. Toxic materials are released when batteries containing mercury or cadmium are put into a municipal incinerator and may be released when landfilled indiscriminately.

Now let's get into studies. The one that is most well known is the Swedish Study. There are two major sites in Sweden where mercury emissions from incinerators were studied: Uppsala and Stockholm. In 1980, a study was begun in Uppsala to determine the feasibility and benefits of removing household batteries from incinerator feed. Mercury levels were measured both before and after a trial battery collection program in the stack gasses, fly ash and, boiler ash. Even though it was estimated that only 50- 60% of the mercury oxide and 20-30% of the alkaline batteries were collected, a 60% decrease in the total mercury emissions were noted. As a result of this study, voluntary collection programs were implemented in those Swedish communities served by incinerators in 1983. In 1986, a study was completed that showed that 35% of the background level of mercury in the environment could still be traced to battery incineration. In December 1986, battery collection was mandated by the Swedish government.

That same year, the Stockholm incinerator mercury emissions were measured and found to be about 1600 pounds annually. This study is the most often quoted by those on both sides of the battery issue. By removal of the batteries from the feed stream AND upgrading pollution control equipment, basically to the standards met by U.S. Municipal Incinerators, an 80% reduction in mercury emissions was obtained.

More recently and closer to home, National Recovery Technologies, Inc. did a study on the effects of source separation on emissions, ash properties, boiler efficiencies, and disposal capacities at three resource recovery facilities in Tennessee. This study was done between 1984 and 1987. Among other findings, a 70% reduction in mercury emissions and a 50% reduction in cadmium in the ash was obtained by the removal of household batteries. An EPA report published this past January sites household batteries as the major source of cadmium in incinerator ash. These studies show conclusively that there is a direct correlation between reduction of mercury emissions and the removal of household batteries. If anyone would like a copy of these studies, leave me your card at the end of the session.

New York State has responded to the household battery problem by implementing new regulations this past January. These provisions require that an applicant for a permit to operate a resource recovery facility have a waste control plan. This plan must prevent, to the extent that it is practical, receipt of "untreatable waste" at the facility. The Department's definition of untreatable waste includes household batteries. In the environmental impact statement, the Department indicates that it is a requirement of the provision that collection and disposal of household batteries be addressed as part of the waste control plan. Further, the Dept. states that the batteries may be recycled or disposed of in an appropriate landfill. New York state is requiring that the battery issue be addressed. It is indeed time to act. What can be done with the nearly 200 million pounds of batteries discarded in the US each year? Mercury Refining Company has developed household battery programs which in total we call, "The Assault on Battery Pollution©." These programs provide for the environmentally sound disposition of all types of household batteries.

We at MERECO work off a model plan. This model plan has many options in it to provide flexibility for a collector when they are setting up a battery collection program. An example of the issues discussed in the model plan include whether a curbside collection point system makes sense. It depends on many factors including whether a curbside collection program already exists, what other resources are available to the collector including volunteer organizations, government employees who would be dedicated to this, available collection locations that make sense, etc.

Let's review how some of the more general aspects of the program can work.

The household battery market consists of six system types of batteries:

FIGURE 19

TYPE	HAZARDOUS COMPONENT	REMARKS
Carbon Zinc	Mercury	C and D cells; 9V, AA, etc. Along with alkaline makes up over 50% of the battery market.
Alkaline	Mercury Manganese Dioxide	long life C and D cells, etc.
Mercury	Mercury	hearing aids, medical devices, pagers, button batteries for watches, cameras, etc.
Silver	Silver	button batteries for calculators, watches, cameras, etc.
Nickel-Cadmium	Cadmium	rechargeable; in smoke alarms, appliances, tools etc.
Lithium	Lithium	cameras, computers, mostly button sizes now; fastest market growth.

Because each type of battery has a unique chemical makeup, environmentally sound disposal differs for each type of battery. Drawing on over thirty years experience in recycling button batteries, MERECO has designed a disposal plan that considers both economics and environmental safety. Mercury Refining has been recovering mercury from mercury type batteries since 1955 and mercury and silver from silver oxide batteries since the early sixties when they came into common household usage. These batteries are recycled at our facility in Albany. The value of the contained metals is such that we offer payment for these batteries. It is not economically feasible utilizing current technology to recycle carbon-zinc and alkaline batteries based just on their value of the contained metals.

MERECO is willing to process these batteries for mercury recovery however, the costs are very high, especially in comparison to the economically sound alternative of putting them in a hazardous waste landfill. While this may not be an optimal solution, it is the most logical given the technology available, AND it accomplishes our goal, which is to keep these batteries out of our incinerators and unlined municipal landfills.

MERECO will forward Nickel-Cadmium batteries to an environmentally sound recycling facility. Currently we accept Nickel Cadmium batteries at no charge to the collector. If lithium cells are received, they will be sent on to a TSDF for deactivating prior to secure landfilling. There is a charge for this procedure, but the total cost for dealing with lithium batteries is small because they are a small percentage of the market.

The two keys to a successful program implementation and continued participation are: Education of the community at large to the dangers of indiscriminate household battery disposition and what they can do about it. Secondly, convenient location of the collection point.

The educational campaign information would need to be developed and implemented. The information could be distributed in many ways: through schools, government agencies, point of sale signs and displays, news releases, through speeches by MERECO personnel and through direct mail pieces aimed at point of sale managers, teachers and not for profit organizations.

Location:

Now that we have the general public informed of the problem, in order to obtain long-term participation a convenient solution must be provided. If collection locations are not convenient, it may be used in the short run while the general public sees it as an acute problem, but the program will not be maintained. This concept of convenience applies both to curbside pick-up and to central collection points. Let's discuss the central collection points. A central collection program could be carried out at any number of locations:

Collection Location and Display

Possible locations:

1. Point of Sale a. supermarkets b. drug stores c. camera shops d. toy stores e. hearing aid centers f. jewelry stores g. other sales outlets for batteries
2. Public Locations a. schools b. libraries c. public transportation depots

Collection Point Description

The collection point itself would revolve around a container for deposit of batteries with surrounding advertisements encouraging the collection of the batteries, providing information on the benefits of the program and how to go about it. MERECO has developed a battery collection box, specifically designed for collection of household batteries in retail locations. This box has two separate polyethylene bins to allow for the separation of button cells from the larger batteries. The top flaps are hidden, so it is not readily opened, providing extra security. The front face of the box is blank to allow for local adaptation. It has many uses including sponsorship advertising, placement of local recycling logo's and other local buzz words. We also have developed supporting literature, including camera ready point of collection bulletins, letters for store owners, and educational materials.

The point of sale containers and the surrounding promotional material and information will have to be maintained and serviced. Again, this is a point of local adaptation which can be discussed with MERECO personnel. MERECO personnel are available for brainstorming ideas and as a resource for learning about programs currently in place. Sorting and shipping options are better left for critical appraisal rather than brief discussion in a speech.

Let's summarize a few points before I close. Household batteries must be removed from the solid waste stream. They are causing environmental degradation. They are a serious environmental problem that is not easily addressed, or dealt with. Our motto, "Sensible Solutions For Serious Problems©", applies very well to the household battery problem. It is a serious problem and MERECO is willing to work with anyone who sees it as a serious problem to come up with a sensible solution. Yes, some of these batteries can be recycled, which is the best solution, but just because they all can't be recycled doesn't mean that we can be slow to act. They are causing problems now. They must be pulled out of the waste stream now. They are causing environmental harm now. There is no reason not to act now because solutions are available that eliminate the threat.

MOBILE FACILITY SPEECH

by Henry Draper

I. INTRODUCTION

A. I'm here today to talk to you about King County's mobile household hazardous waste collection facility, now officially the Household Hazardous Wastemobile.

B. I'll structure my time talking briefly about the evolution of the Household Hazardous Wastemobile; spend the bulk of my time on program development, facility design and operation; and then wrap up. I understand that there will be an opportunity for questions at the end of the panel discussion.

II. WHY A WASTEMOBILE?

A. Evolved from Household Hazardous Waste Roundups

B. King County faced many challenges in this evolution

1. Size of County.
2. Impacts of Roundup success
    a. Staff intensive
    b. Cost
    c. Uncertainty of follow-up
    d. On the positive side were citizen participation and support, strong Council support, the regions tremendous intergovernmental cooperation (K.C.

Seattle, the Health Department, Metro, and the Suburban Cities), and finally the Northwest's environmental ethic.

3. Hazardous Waste Management Plan's Influence
    a. Interim step between Roundups and a mix of permanent and mobile facilities
    b. Opportunity to assess need for permanent facilities while providing service
    c. When Plan is full implemented, mobile facilities will serve areas of the County missed by permanent facilities

III. PROGRAM DEVELOPMENT AND FACILITY OPERATION

A. Chemical company selected
  1. Chose to go with a two year contract, with the company providing staff and equipment. That decision will be reexamined when the contract expires.
  2. Budget: $1,500,000 for 27 months.

B. Facility Design and Operation
  1. Slides of facility and operation.
  2. Five to six thousand square foot fenced area
  3. Canopy covered work area (with ground cover underfoot)

4. Modified trailer and support unit are the hub of the operation. They contain:
    a. Office and breakroom
    b. Electric Generator, Compressor, and Water System
    c. Fire response system
    e. Haz Cat lab

5. A Bathroom, Emergency Shower, and First Aid Station are also incorporated into the site

6. Facility operation will be similar to a Roundup, except that four hours after operations cease the entire operation can be ready to move on to the next scheduled site.

7. Operations
    a. Two week stays
    b. Three day, seven hour per day operation
    c. Three to five trained staff on site

C. Program development presented several challenges
    1. No one has really done this before
    2. Project goal was safe, convenient, cost efficient HHW collection
    3. Geographic scope of the area to be covered
    4. Permitting (Fire Depts. have been helpful and supportive)

INGHAM COUNTY, MICHIGAN
PERMANENT PROGRAM

Bob Ceru, Chief, Special Programs,
Ingham County Health Department, Lansing, MI

The Ingham County Health Department has been involved in household hazardous waste collections since September 7, 1985 when the initial collection took place. Aided by a grant from the US E.P.A. the one-day collection served 341 households out of an estimated 95,000 in the county.

The experience of a one-day collection induced the Health Department to initiate Michigan's first permanent program in September, 1986. The program was funded in 1986 and 1989 from the County budget and in 1987-88 from a grant by the US E.P.A.

The permanent program utilizes an appointment system which facilitates a safer and easier to manage program. Homeowners contact the department for an appointment and identify the materials they want to bring to the collection center. An appointment time is assigned and specific packaging and transportation instructions are given. The maximum number of appointments per 15 minutes is 4-6. A reminder postcard is sent to each person one to two weeks prior to the collection. One collection is held per month (March - November) from 9:00 a.m. to noon. Figure 1 is the appointment system phone sheet that is utilized for each appointment.

Through the appointment system, we know in advance if any special supplies or equipment are needed, how many staff are required and whether any special safety precautions need to be considered for specific chemicals. Public education is considerably facilitated in the direct one-to-one conversations and misunderstandings about the types of wastes accepted are lessened. Local recycling and reuse initiatives are more effective with time for more planning. And finally, the risks of mishandling, mishaps, or human exposure during handling, packaging and transporting are considerably reduced.

From September 1986 through September 1989 approximately 714 households have participated in the program. Between 1986 and 1988 the average cost per household was $50 - $60. During 1989 the average cost per household has been $75 - $80. The increase in cost per household is attributed to increases in disposal costs, fewer places to recycle paint products and increasing amount of wastes brought in by each household.

An existing 25' by 50' garage with a cement floor is utilized for the collection. There are no drains in the building. Spill response equipment includes 5, 15 and 35 gallon plastic containers, 55 gallon steel drums, absorbents (vermiculite, oil dry, saw dust and sand), and an arrangement with the local fire department for any major mishap. A combustible gas and oxygen meter is used along with a HNU meter at each collection for air monitoring. Other safety equipment includes fire extinguishers, portable eyewash facility and various types of personal protective clothing.

The scheduling of appointments is handled by a Hazardous waste extension agent from the Michigan State Cooperative extension Service and Health Department Staff. All Health Department staff work in the area of toxic materials and hazardous waste and include a RCRA certified hazardous waste inspector, toxicologists and biochemists. Staffing for the collection program is divided into four main teams: traffic control, education, transporter and materials handling. Additionally, a paramedic or the Emergency Services Coordinator for the county is usually present for each collection.

All materials brought to the collection center are carried to the sorting table by someone from the transporter team. The material is then sorted and placed in 55 gallon drums or DOT flammable liquid boxes according to compatibility class. No commingling or consolidation takes place at the collection center. All materials suited for use are placed in a specified area of the garage. Those people or groups that have made arrangements for the material pick them up between noon and 12:30 p.m.

All wastes collected are picked up by a licensed hazardous waste hauler between noon and 12:30 p.m. the day of the collection. The hauler is listed as the generator on all of the manifests and their E.P.A. Generator ID number is utilized. The waste is transported to their TSDF for consolidation, blending, treatment or repackaging. Whenever possible high-temperature incineration at a licensed hazardous waste incinerator is utilized as the disposal method.

Although the present budget is only $20,000 per year for the program, our efforts show that a permanent program can be initiated on a limited budget. With higher future funding anticipated, it is planned to expand the participation and scope of the program.

FIGURE 20

Ingham County Health Department Household Hazardous Waste Program Phone Interview Sheet.

Date ____________ APPOINTMENT DATE ____________
Interviewer ____________ TIME ____________

NAME ____________ PHONE (H) ____________
ADDRESS ____________ (W) ____________
CITY ____________ ZIP ______

1

Material Name	EPA REG NO.	LIQUID/SOLID/AEROSOL	VOLUME	*

*CHECK THIS COLUMN FOR ITEMS DELIVERED BUT NOT MENTIONED IN INTERVIEW.

2 PACKAGING DIRECTIONS TO CALLER.

☐ A. If the material is not in the original container. PUT LABEL ON THE CONTAINER with the NAME OF THE MATERIAL.
☐ B. For solid materials: Place EACH container in its own CLEAR plastic bag and secure.
☐ C. For liquid materials: Make sure the cap is secure and the container is not leaking.
☐ D. If no cap, provide other means to cap container.
☐ E. If leaking, place in a non-leaking container and LABEL.

3 TRANSPORTATION

☐ Place container(s) in a small box with good bottom so they cannot break if bounced around. If glass, put paper between them.
☐ Put the box on the floor or in the trunk of the car. DO NOT carry them on the front seat.

4 REMINDERS

☐ Name, address, phone number
☐ Appointment time established
☐ Directions to collection site
☐ Do you have any questions?
☐ Thank citizen for participation
☐ POSTCARD REMINDER NOTICE SENT

FLORIDA'S PERMANENT HAZARDOUS WASTE COLLECTION CENTERS

by Jan Kleman

A major step towards establishing a network of permanent hazardous waste collection centers at the local level was realized when the 1985 Florida Legislature created the Hazardous Waste Collection Center Grant Program. The program provided up to $50,000 per county for capital outlay costs associated with construction of permanent, safe, secure, operational hazardous waste collection centers. Each grantee was required to do the following:

. Enter into a contract with a licensed, insured private company responsible for collecting hazardous waste and assuring the proper and most appropriate management of the waste.

. Guarantee the operation of the collection center for 2 years, including at least 2 advertised collections per year, free of charge, to households.

. Provide at least 2 days per year when conditionally exempt small quantity generators or CEGs, could bring their wastes to the collection center in order to obtain a reduced fee for proper disposal of their wastes.

. And finally, the local government was responsible for working with its contractor to establish "milk-run" pick up services to regulated small quantity generators or CEGs.

Sounds simple, however, it took nearly 2 years of pleading and coaxing to get any local governments to apply for the grant. Even then, only 7 counties initially took advantage of the opportunity. Local governments were hesitant to apply for the grant and construct their collection centers for several reasons:

. Although the grant paid up to $50,000 for collection center construction, some local governments decided that just was not enough funding for capital outlay or enough incentive to commit to grant requirements.

. Most local governments lacked funding to operate their collection centers, including providing a minimum of 4 "free" household collections during a 2 year period.

. Also, local governments were initially concerned that they would not be able to find an acceptable contractor at the right price.

. Finally, the NIMBY (not in my backyard) problem existed in many communities.

The 7 original grantees were true pioneers with lots of problems and frustrations. Some counties had 4 or 5 different project managers as the responsibility for collection center construction and operation was bounced around from department to department. Most counties did not have adequate funding mechanisms in place for collection center operation. Some sites for centers needed to be changed when NIMBY reared its ugly head. However, all 7 counties have either worked out all of their problems or are close to it. The project managers are to be commended for the way they have pulled their programs together creating some outstanding success stories.

When the Hazardous Waste Collection Center Grant Program was authorized for a second time, the limit per county for all local governments in the county was raised to $100,000. This time there was no need for the State to do any arm twisting, as the idea of permanent collection centers had caught on in Florida. Grant applications exceeded available funding and awards were made to 11 counties who are currently building their centers. Four of those counties are building at 2 or more sites.

Steps were taken to assure that these 11 grantees would not encounter the same problems that the original 7 had experienced. In order to cut down on the number of times the local project manager's hat shifted heads, we determined which department within the local government would be responsible for the collection center operation and encouraged appropriate staff to become involved early on in the grant application process. This helped alleviate the potential problem encountered as a result of a grant writer or environmental department staff making decisions for several months before the program transferred to solid waste staff. We also required that applications for funding provide the following:

. Assurance that the chosen site was approved by the local governing body applying for the grant.

. A description of the anticipated plan of operation for the collection center.

. Assurance of the availability of funding for collection center operation.

Most funding comes from counties' solid waste enterprise funds, specifically from increasing tipping fees. One county adds a $2 surcharge to the annual property tax for residential property.

So far, all grantees have opted to order prefabricated storage buildings for storing hazardous waste at their centers, as well as prefabricated sheds for storing equipment. If office space is needed, a trailer is used.

Only a limited amount of the grant can be used for consulting or engineering fees. Those services should only be needed for site preparation and in reading the blueprints we provide for pouring the concrete slab upon which the hazardous waste storage building rests. Other construction is limited to the necessary driveways, gates, fencing and utilities. Several collection centers have a concrete apron in front of the hazardous waste storage building covered by a canopy extending out from the building. This provides an ideal area for lab packing.

No RCRA permitting is required for the site since only household hazardous waste is expected to be stored until the contractor is again on-site to take the wastes. Of course, there is the capability of very temporarily storing abandoned drums or SQG wastes. These regulated wastes could safely be held at the center for a few days until the contractor could take possession.

The storage buildings the grantees have selected have similar features and are complete turnkey structures. They are welded steel containers specifically made for storing hazardous materials. A building can store up to forty 55-gallon drums and is divided into 2 or 3 bays. The buildings have spill containment reservoirs and sump pumps, along with the necessary and optional safety features.

We encourage 2-lane driveways leading to and from a collection center and adequate space for the contractor to bring in trucks and equipment. The traffic flow works best if it moves in one direction along a U-shaped or circular driveway. As a participant waits for off-loading in front of the collection center, he is greeted by county staff and asked to answer a few questions on a participation sheet. After the contractor has taken possession of the hazardous wastes that it will be managing, the participant continues along the driveway to other off-loading points. Latex paint, lead-acid batteries, used motor oil and non-hazardous recyclable wastes will be taken from the participant by county staff at different drop-off points.

The next few slides show center activity on the advertised collection days. Household and CEG advertised collections, with contractor on-site, may be held simultaneously or separately. Some grantees have the contractor on-site once a month for advertised CEG collections. During these monthly visits, the contractor also makes "milk-run" type collections to SQGs.

Many project managers publicize a hazardous waste management hotline where citizens can call for advice. Most counties provide the opportunity for households to bring their wastes to the center between big collection days. There they are safely stored until the next time the contractor is on-site. Some counties have full time chemists on-site and their collection centers are open daily to households.

As you can see, our grant program has really taken off. Nearly 1/3 of our counties in Florida have taken advantage of state funding to construct 1 or more hazardous waste collection centers. Several additional local governments will be awarded grants within a few months. However, the program has one major drawback. Many small or rural counties have not been able to participate in the program because they lack the adequate funding to fulfill the grant requirement of operating their centers for 2 years. But there is a solution. We are expanding the grant program to include the Cooperative Collection Center Arrangement. Copies of draft legislation are available. Under this program, a host local government with an operational hazardous waste collection center would enter into an agreement with a rural neighboring county. The host government would receive $10,000 for its effort in planning a mobile hazardous waste collection in the neighboring county. The neighboring county would only pay for 25% of its collection day and the grant would pay the other 75% with a limit of $25,000.

The Hazardous Waste Collection Center Grant Program gives the incentive for local governments in Florida to establish permanent centers and ongoing comprehensive hazardous waste management programs. It is a pleasure to share Florida's success story with you.

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Canada's Permanent Programs

by Claudia Marsales

The growth of HHW programs in Canada has in many ways paralleled the American experience. While many provinces and municipalities have integrated Household Hazardous Waste programs as part of their waste management planning process, only Ontario and British Columbia have established permanent collection depots.

The first Canadian Household Hazardous Waste programs took place in Ontario in the Regional Municipality of Waterloo and Niagara-on-the-Lake in 1983 and 1984.

The results of these first attempts were satisfactory from an operating point of view - everything went well - but citizen participation was less than had been hoped and the ultimate costs of these pilot programs were high - due in part to excessive manpower on site relative to the poor public response.

In 1986 the Ontario Ministry of the Environment introduced a new program to assist municipalities in conducting Household Hazardous Waste collection projects. The grant program provides up to $15,000 to any municipality sponsoring a Household Hazardous Waste day or establishing a permanent collection depot.

Ontario's grant program assists municipalities with promotion - providing posters, flyers, and technical guidance. Eligible costs include payment to a waste management contractor, promotional costs, wages and benefits if municipal staff are involved.

With the availability of funding, the number of programs sky rocketed. In 1989, over 50 HHW days have been held and several permanent depots have been established.

By any standards, Ontario's Household Hazardous Waste program has been a runaway success. In fact, some projects have been too successful. Recently, the public response for several one day events was so great that depots reached capacity and enthusiastic residents were turned away. In May, one program had to close their collection program after just 3 hours of operation, when approximately 2000 participants showed up on Saturday morning.

There had to be a better way.

The answer for many Ontario municipalities has been the development of permanent depots - based on the Dana Duxbury definition - open at least once a month all year round. Without question, permanent depots best meet the needs of the community at substantive cost savings per volume of waste collected and disposed.

Ontario's first permanent depot opened in 1985 in the Region of Waterloo which continues to operate two facilities today.

Ontario's most innovative program is Metro Toronto's. With a population of 2.5 million people, Metro Toronto is Canada's largest urban centre. Metro's Household Hazardous Waste program consists of ten permanent depots, a Toxic Taxi service and a telephone hotline.

All depots and the Toxic Taxi are operated by specially trained Municipal staff. In Ontario, depot plans must satisfy the requirements of the Ministry of the Environment which issues a Certificate of Approval to operate a waste transfer facility.

Initially Metro's storage facilities have consisted of garden sheds, modified to include an epoxy - coated steel sump, ventilation hoods and steel shelving. An upgrading of the depots is now underway - with permanent structures replacing the temporary sheds. A second Toxic Taxi will be on the road in 1990 in response to the high demand for this service.

Metro . 450,000 single family residents units
Toronto . 380,000 apartment units

Each depot is equipped with:

- chemical burn kit
- first aid kit
- emergency shower or eyewash
- goggles and face shield
- dust/fume respirators
- PVC gloves
- safety glasses
- fire extingisher
- placards
- spill clean up kit
- disposable chemical resistant coveralls
- vermiculite

The standards for permanent facilities include: (These are MINIMUM standards)

- 500 sq.ft. of space - minimum
- a separate - plus ventilated office
- air ventilation system
- fire sprinkler system
- emergency shower system
- testing and bulking area
- explosion proof electrical system
- operation manuals

To address the problem often experienced in large urban centers of residents lacking transportation and the elderly, Metro initiated Canada's first Toxic Taxi program.

This program operates as follows:

- Residents of Metro can call Metro works department requesting a pick-up. They are assigned a date and informed they must be home on the day of the pick-up.
- The Toxic Taxi is a cube van - with a driver and chemist.
- The waste must be properly packaged and labelled.
- At each stop the waste is inventoried, sorted into compatible groupings and packed in steel drums which are sealed and secured before moving on.
- At the end of the day, all drums and waste are removed to a depot in accordance with Ministry of the Environment regulations.
- One truck makes 10-12 pick-ups per day.

Regulations prohibit the acceptance of:

- Containers larger than 20 litres.
- More than 50 litres of material.
- Commercial and industrial waste.
- Pathological or radioactive wastes.
- Unidentified wastes.

All staff working on the Household Hazardous Waste program are trained in procedures to receive, handle, sort, document and store these wastes.

Emphasis is placed on avoiding accidental mixing or storage of incompatible chemicals which may cause a reaction.

The 1989 cost of the Metro program was $1 million or $160-79 for each participant.

The Toxic Taxi cost $275,000 per year of which $130,000 was for disposal of the wastes.

Funding is provided from:

- general tax levy
- tipping fees
- grants from the Ministry of the Environment

Situated beside Metro Toronto is the Region of Peel. With a population of close to one million, the Region currently has a permanent depot at the landfill site open every Saturday and Sunday year round. Plans are currently underway to open two more permanent facilities. Operating cost for 1989 will be approximately $250,000.

- two staff
- 60 participants on average per day

In Quebec it is the responsibility of individual municipalities to sponsor their own collection programs. Last spring the Montreal urban community simultaneously ran 32 programs on one day, collecting 2,000 drums of waste. The cost of this program was in excess of $1 million dollars. Montreal is planning to open permanent collection sites in 1990.

Waste collection days have been held each June in Winnipeg, Manitoba for three years. The Manitoba Hazardous Waste Management Corporation is working on setting up a year round drop-off point in Winnipeg.

The Alberta Waste Management Corporation has begun the first in a series of Toxic Roundups. Nine communities were chosen to participate; they provided sites and conduct local promotions. The Alberta Special Waste Services Association provided qualified personnel to collect and pack the wastes.

It is anticipated that this pilot program will enable the provincial government to collect information needed to plan a province wide collection program. Program budget was $170,000.

This year the Alberta Pharmaceutical Association sponsored a very successful province wide campaign to collect old drugs.

The province of British Columbia has eight permanent depots situated throughout the province operated by the province. Wastes that cannot be recycled or neutralized are shipped to Ontario for disposal at a cost of $100,000.

Concluding Remarks

Some time ago I attended a conference that contained a strong environmental message. The speakers name was Spilhous, and American scientist. The topic of his lecture was "The next Industrial Revolution." His thesis was that the next industrial revolution will be the generating of a new industry. This new industry will not take things to the user, but from the user after his use, and reprocess them and put them back to the manufacturer. This industry will not produce a product other than a clean environment. It will reprocess things we call waste so that they may be reproduced into things we need.

SAN FRANCISCO'S
HOUSEHOLD HAZARDOUS WASTE COLLECTION FACILITY
EIGHTEEN MONTHS OF OPERATION

by Cedar Kehoe

Introduction

Since San Francisco's Household Hazardous Waste Collection Facility (HHWCF) celebrated it's first birthday on January 21, 1989, usage at the facility has been on the rise. This paper discusses facility operations from January 21, 1988, opening day of the facility, to July 21, 1989.

This report will provide highlights of the facility's background, achievements, obligations, and educational efforts in the following areas:

- o Background information
- o Resident participation
- o Volumes of hazardous waste managed at the HHWCF
- o Recycling program
- o Industrial hygiene report
- o Staff training
- o Community outreach/education
- o Facility safety
- o Disposal of special wastes
- o Future plans

Background Information

On January 21, 1988, Sanitary Fill Company, in conjunction with the City and County of San Francisco, opened the Household Hazardous Waste Collection Facility. The facility provides residents of San Francisco with a safe means of disposing of their household-generated hazardous wastes. It was initially a one-year pilot program, but due to its success the facility is now a permanent public service for San Francisco residents. The facility is open to residents on Thursday, Friday and Saturday from 8 a.m. to 4 p.m.

The City and County of San Francisco (the City) and Sanitary Fill Company developed a Waste Acceptance Control Program (WACP). The program is designed to identify prohibited wastes that are delivered to the San Francisco Solid Waste Transfer and Recycling Center (SFSWTRC), which is owned and operated by Sanitary Fill Company. This loadchecking program was developed to ensure the transport of high quality, clean garbage to the Altamont Landfill. One of the goals of the WACP is to encourage the proper disposal of prohibited wastes (any liquid or hazardous waste)[1] and to assist with their proper management when delivered to the SFSWTRC. As a result of the WACP efforts there was a need for the temporary storage of the prohibited materials discovered in the load checking program, until proper disposal could be arranged. Consequently, the concept of a temporary storage facility was established.

An additional consideration in the opening of the HHWCF was the authorization under California State Assembly Bill 2948 (Tanner. 1986) for the City to prepare a plan to deal with hazardous wastes generated within San Francisco. The plan, referred to as the County Hazardous Waste Management Plan, identified a need for a program that will handle small quantities of business and household hazardous wastes.

Resident Participation

Use of the facility continues to grow: 5,513 people have delivered household hazardous waste in the facility's first 18 months. This number does not include the number of people who were turned away because they could not prove residency or because the waste was not of household origin. The average number of participants per week was 70. 2,294 residents used the facility in the first half of the second year (January 21, 1989 to July 21, 1989), compared to 1,842 residents during the second half of the first year, an increase of 26%. 1,377 residents used the facility the first half of the first year. (See Table 1)

The total number of containers received at the facility increased in each six month period. 24,486 containers were received in the first six month. 32,165 the second six months, and 35,764 the third six months. (See Table 1) The number of containers increased while the average number of containers delivered per person fell.

Volumes of Waste Managed at the HHWCF

Figure 1 presents a pie chart showing the types of products delivered to the facility. The percentages in this chart are based on the number of containers or units of each type delivered to the HHWCF. The size of container or volume of hazardous waste in the container are not represented in this chart. Asbestos is not included in this chart since it is usually not delivered in containers. Paint products remain the largest single category of product delivered to the facility.

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[1] Hazardous and designated wastes are included within the definition of prohibited waste.

Figure 1 presents the distribution of waste types by drum volume shipped from the HHWCF. "Drum volume" refers to the size of the drum shipped not the amount of hazardous material within the drum. This is an important qualifier because a 55-gallon lab pack drum can by law contain only 20 gallons of hazardous waste, but its drum volume remains 55 gallons. Some disposal facilities have a limit of 15 gallons per 55-gallon lab pack drum. This chart includes all waste shipped off-site, whether to recycling, treatment, incineration or land disposal. Only materials which are unacceptable for incineration, treatment, or recycling (i.e., dioxin precursors and asbestos) are sent for land disposal.

During the first six months of operations paints and solvents were labpacked thus putting less waste in each 55 gallon drum compaired to a bulked drum. After the variance was amended those materials were bucked into 55 gal drums this explains why their volume appears to drop in the second six month period. (See Table 2)

One hundred percent of the oil products, antifreeze and car batteries received at the facility are sent for recycling. One hundred percent of the oil-base paint and solvents collected are sent for blending into a fuel for energy recovery. Corrosives and oxidizers are sent for treatment. The flammable solids, aerosols and poisons are incinerated. Asbestos is sent to landfill.

Recycling Program

The HHWCF Recycling Program focuses on safe post-generation waste reduction techniques, such as reuse and recycling. These alternatives to disposal save money for the program, and by extension for San Francisco residents, as well as conserving natural resources.

During the last six months of operations the latex paint recycling program recorded an impressive 50 percent increase in the volume of paint recycled. 660 gallons of latex paint were shipped for recycling during the last half of the facility's first year while 990 gallons of latex paint were shipped for recycling during the first half of Year Two. In addition to providing paint at no cost to non-profit and community groups, recycling of latex paint offers significant savings over disposal by incineration. The cost of incinerating a drum of paint is presently almost five times the cost of recycling it. The savings this program provides will increase as incineration costs rise over the next few years.

In May Sanitary Fill Company acquired a HAZBIN™ to be used as the official HHWCF Recycle Bin. The Bin is a specially designed chemical storage cabinet located next to the HHWCF lab and within

FIGURE 21.a

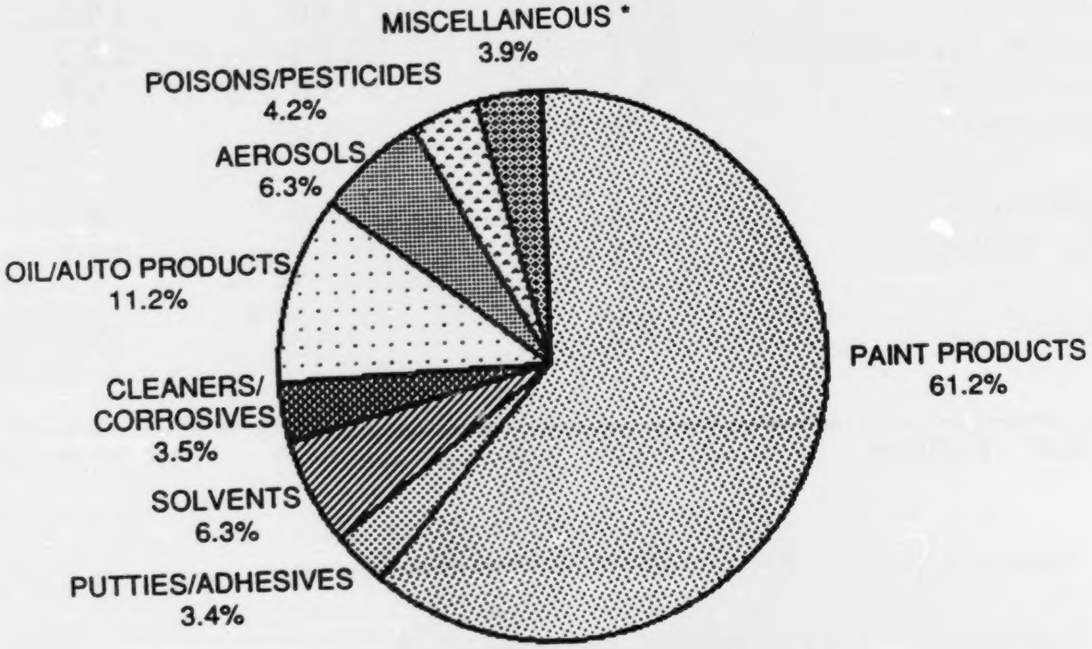
OVERALL HHWCF PARTICIPATION AND CONTAINER DATA

Eighteen Month Summary of HHWCF Operation

Months Covered	Number Days	Number People	Number People/Day	Number Containers
1 - 6	78	1,377	18	24,486
7 - 12	75	1,842	25	32,165
13 - 18	75	2,294	31	35,764
Totals:	**228**	**5,513**		**92,415**

FIGURE 21.b

NUMBER OF CONTAINERS RECEIVED BY PRODUCT TYPE
Eighteen Month Summary of HHWCF Operations



***Includes:**

Car Batteries	Sulfur
Medicines	Cosmetics

Graph does not include 108 yd3 of asbestos.

FIGURE 21.c

Total Drum Volume Shipped from the HHWCF (In gallons)

A Comparison of Three 6 Month Periods

WASTE TYPE	FIRST HALF YEAR ONE 1/88-7/88	SECOND HALF YEAR ONE 7/88-1/89	FIRST HALF YEAR TWO 2/89-7/89
Paint	4,545	4,475	7,150
Oil Products	2,860	4,765	5,550
Flammable Solids[1]	1,630	2,150	2,650
Corrosives/Cleaners	1,390	1,290	1,190
Solvents	3,145	820	1,135
Aerosols	350	550	691
Poisons/Pesticides	820	800	635
Oxidizers	200	230	298
Dioxin Precursors[2]	275	220	220
Antifreeze	85	30	90
Cyanides	0	10	41
Asbestos[3]	12	36	60
Car Batteries[4]	81	111	271
Other[5]	135	225	55
Total Volume	15,516	15,676	19,976

[1] Contained in adhesives, putties and solid waxes/resins.

[2] Contained in wood preserving products.

[3] Measured in cubic yards; not included in total volume.

[4] A car battery is equivalent to 1 gallon of waste.

[5] Includes sulfur waste, organic peroxides, PCB waste and California regulated wastes not included in other categories.

the facility's external containment. Unopened and/or still usable paint and household products which are delivered to the HHWCF are stored in the Recycle Bin and facility users are encouraged to take any products for reuse that they would otherwise buy new.

Signature of a waiver form is required of all users of the Recycle Bin, including employees. The waiver releases SFC and the City from product liability and keeps track of the volume of wastes reused instead of disposed.

During the last six months, approximately 100 gallons of non-paint products were "disposed" through the Recycle Bin. The majority of this material would have required labpacking and incineration. Since only 20 gallons are allowed per labpack drum, the 100 gallons of products accepted for reuse represent five labpacks at a disposal cost of approximately $2,000. We are very excited and pleased with the positive response and significant savings the Recycle Bin has generated.

Industrial Hygiene Report

Although not a required element of HHWCF operations, the Facility Manager arranged for an independent consulting company to conduct a safety audit of HHWCF operations in March 1989. The purpose of the audit was to ensure compliance with OSHA health and safety standards and with SFC's policy of providing a safe working environment for all employees. The safety audit focused on (1) employee solvent exposure during paint and solvent consolidation, (2) employee asbestos exposure during asbestos repackaging, and (3) general compliance with OSHA standards. In addition, industrial hygienists performed and documented respirator suitability evaluation and fit testing. Personnel monitoring results for both paint/solvent consolidation and asbestos repackaging revealed that employee exposure was well below permissible exposure levels.

Staff Training

SFC and the City have agreed to an ambitious and challenging training program for personnel employed in the HHWCF. The program utilizes in-house training seminars as well as classes and conferences offered through local universities and professional associations. In many cases, HHWCF staff attend trainings with members of the Waste Acceptance Control Program.

All employees working in the facility, including backup staff, have completed the 40 hour health and safety training program mandated by OSHA for hazardous waste site workers. Facility employees also participate in an evacuation drill and training presented to all SFC employees to test the procedures necessary in the event of a large-scale emergency.

In-house training seminars were presented to facility staff on subjects including CPR/First Aid, consequences of exposure to asbestos and infectious waste, waste manifest and shipping paper preparation, and contractual and legal obligations motivating the HHWCF and WACP programs. In addition, Captain Jerry Grey of the San Francisco Fire Department presented three training sessions focused on emergency response planning, procedures, and gas monitoring.

Beginning in May of the report period and on a continuing basis, Tom Watkins, HHWCF Supervisor and Chemist, is providing facility and WACP employees with weekly training in waste analysis procedures. The class includes instruction in both HAZCAT™ and the new Waste Identification and Characterization Test™ (WICT™). The WICT, developed by Mr. Watkins for use in the facility, is an innovative modification of existing waste analysis procedures specifically designed to analyze household hazardous wastes. The WICT method not only determines the chemical content of a compound, but also assigns the correct hazard class for shipment and disposal purposes.

Community Outreach/Education

The City and Sanitary Fill Company believe that education is a critical element in assisting San Francisco to develop an integrated and environmentally protective waste management system. As specified in the Facility Operations Manual, the City has taken primary responsibility for implementing the public education component, while SFC has taken responsibility for the public information component, i.e., advising San Francisco residents of the availability of the HHWCF.

Facility staff made presentations ranging from the proper disposal of household hazardous waste to alternatives to toxic products. These presentations were made to a wide range of audiences including, local neighborhood associations, trade associations, Chamber of Commerce, County Solid Waste and Hazardous Materials Commissions, various national conferences, the Governmental Refuse Collection and Disposal Association, the San Francisco Lung Association, and the Toxics Subcommittee of the Sierra Club, to name a few. In addition, fliers have been developed and placed into all residential garbage bills to educate the homeowner on proper management of household toxics.

The HHWCF is also a popular attractionon public tours. During the last six months, over 700 people visited the HHWCF while touring Sanitary Fill Company. In addition, special tours of the HHWCF were provided for members of the Alameda County Hazardous

Waste Authority, the State of New Jersey Hazardous Waste Facilities Siting Commission, the Massachusetts Water Resources Authority, the Council on the Environment of New York City, and the San Mateo County Environmental Health Services, among others. Many people requesting tours of the HHWCF are interested in establishing their own household hazardous waste program and look to the San Francisco facility as a model.

Facility_Safety

Since operations began, no reportable releases of hazardous materials have occurred from the handling of approximately 92,415 containers at the HHWCF. The facility was constructed to safety standards required of a Treatment, Storage and Disposal Facility. These features include: (1) separate containment bays, (2) compliance with the Uniform Building Code (explosion proof), (3) double containment, (4) grounding columns, (5) sufficient ventilation, and (6) various equipment (i.e. extinguishers, fire hose, emergency showers and spill gear). These safety features are necessary to insure that if any incident did occur it could be properly managed.

Disposal_of_Special_Wastes

The current Variance Determination granted by the Department of Health Services to operate the HHWCF prohibits the voluntary receipt of certain types of wastes. However, numerous requests have been made of the staff to accept these material. Under the procedures established in the Facility Operations Manual, HHWCF employees must comply with the following steps in handling "special wastes" such as explosives.

1. Staff immediately notifies the San Francisco Bomb Squad and arranges for pick up of the wastes.
2. Staff notifies the San Francisco Department of Public Health (SFDPH) within 48 hours of receiving a special waste.
3. A form describing what types of special waste were received is prepared and a copy mailed to SFDPH.
4. The Bomb Squad signs and dates the above form prior to removing the explosives from the HHWCF.

These procedures were established to ensure that public health is not threatened by the potential risks of further storage and transportation associated with refusing old and deteriorated explosives. Examples of these materials include flares, bullets, shot gun shells, carbon dioxide cartridges, gopher bombs, butane cartridges, and cans of gunpowder. All such materials received at the HHWCF have been collected by the San Francisco Bomb Squad.

Future Plans

Small Quantity Generators (SQGs) are those individuals or companies which generate less than 1000 kg (approximately one ton) of hazardous waste per month in the course of doing business. According to San Francisco's County Hazardous Waste Management Plan (CHWMP), 90% of the generators of hazardous waste in the City are SQGs. These SQGs generate approximately 60% of the City's estimated quantity of hazardous waste. Sanitary Fill Company is attempting to expand the HHWCF to address the needs of the SQGs. Sanitary Fill Company has drafted a RCRA Part B permit application to store and treat hazardous waste from SQGs at the site of the current HHWCF. At the request of the City, Sanitary Fill Company is currently waiting for the City to complete the CHWMP before proceeding with the submittal of the permit application.

For additional information on San Francisco's innovative HHWCF, contact Cedar C. Kehoe, Hazardous Waste Program Manager, Sanitary Fill Company (415) 468-2442 or Joe Johnson, Solid Waste Management Program, Chief Administrative Office City and County of San Francisco, (415) 554-4334.

AN OVERVIEW OF PERMANENT HHWM FACILITIES

Dana Duxbury
Dana Duxbury & Associates

During the past few years, there has been increased interest in establishing permanent drop-off centers for HHW. A permanent drop-off program most importantly provides the homeowner or conditionally exempt generator with a place to bring their HHW when needed. Permanent facilities also enable the sponsor to store and consolidate HHW on-site. Storage and consolidation can reduce hazardous waste contractor costs because the sponsor does not have to send partially full drums or partially full truck loads off-site, as is the case when there is no on-site storage. This in effect may reduce transportation/management costs per drum. Program sponsors may also find ways to have some of the reusable material used up in the community, rather than sending it off to be managed as hazardous waste.

Definition

Permanent facilities have been defined by Dana Duxbury & Associates (DD&A) as a dedicated facility (fixed or mobile) that is open at least once per month. In 1989, the country's first mobile permanent facility was opened in King County, Washington. This facility is to be open at one location on two successive weeks from Thursday-Saturday at 24 sites during two years.

Number of Permanent Programs

Thirty-six facilities were operating in the U.S. at the end of 1989, with many more in the planning stages. Appendix VII shows the growth per year and the number in each state. Summaries of permanent programs can obtained by using the order form in Appendix X.

Sponsor

Permanent programs are sponsored by a wide array of entities, with public works/solid waste departments and health departments the most frequent sponsors. Sponsors include:

Sponsor	Number of Programs
Health Department	14
Public Works/Solid Waste	11
State Agency	4
Natural Resources/Environ. Management	2
Treatment, Storage, and Disposal Facility	2
Wastewater Treatment Plant	1
Human Services	1

Site Location

Locations vary, but landfills and health department sites predominate.

Site	Number of Programs
Landfill	6
Health Department	6
Recycling Center	4
Public Works Department	4
Fire Department	3
Wastewater Treatment Plant	3
County Complex	2
Transfer Station	2
Treatment, Storage, and Disposal Facility	2
Fairgrounds	1
City Lot	1
Mobile Program	1

Type of Facility

Sponsors have used pre-existing buildings, purchased prefabricated buildings, modified existing structures, and built new buildings. Pre-fabricated structures are the most common facility.

Type of Facility	Number of Programs
Pre-fabricated*	16
Existing/Modified Buildings	10
Modified Cargo/Shipping Containers	3
New Building*	3
TSDF	2
Modified Trailer	1
Mobile Modified Trailer	1

*Anchorage, Alaska uses a pre-fab and a new building.

Size of Facilities

Facility sizes vary dramatically. Most current pre-fabricated facilities purchased for permanent programs are 8' x 20'. Experience to date shows that communities are likely to need more than 160 square feet for sufficient storage, consolidation, and receiving space.

Largest facilities:

Anchorage Collection Center - 6,000 square feet
Kent County - 2,800 square feet (40'x 70')
San Francisco - 2,400 square feet (30'x 80')

Smallest facilities:

Volusia County - 72 square feet (8'x 9')
Larimer County - 112 square feet (14'x 8')
Thurston County - 126 square feet (14'x 9')

Facility Costs

Total facility costs vary according to size and complexity of the facilities. Also, some sponsors had equipment donated, chose to modify structures them selves, or do not have on-site storage. Costs ranged from $1.7 million for the Anchorage, AK collection center and drop-off station, to $2,330 for modifications of the donated tractor trailer body used by Martha's Vineyard, MA. Pre-fabricated storage facilities cost approximately $20,000 and vary depending upon desired features.

Participant Fees

Four programs chose to charge participants who bring HHW to the collection center. Larimer County, Colorado charged the largest fee - $10 per pound - and only had five participants in six months. The fee has been discontinued on a trial basis.

Appointments

Eight program sponsors require participants to make an appointment before bringing HHW to a collection center. Appointments can ensure that participants bring only HHW targeted by the program, that they receive special packaging and transportation instructions, that sufficient personnel are available, and that local uses may be found for the materials brought to the site.

Problems

Participation levels at permanent facilities may be more difficult to maintain than one-day collections because it is difficult to obtain continuous media coverage, and because people may procrastinate - knowing that they have many opportunities to bring their HHW to a collection site. It may be necessary to hold high visibility one-day events in conjunction with the permanent program to ensure adequate participation. Promoting the program through real estate firms can also help participation by targeting those people who have stored HHW and are moving to or from the community. Forty to fifty million people in the U.S. move each year, indicating a large transient population in most communities.

*Permanent program map and chart appear in Appendix VII

PERMANENT HOUSEHOLD HAZARDOUS WASTE FACILITY STANDARDS

NED T. BROOKS

MINNESOTA POLLUTION CONTROL AGENCY

Over thirty permanent programs to manage household hazardous waste (HHW) have been established to date with a significant increase expected in the near future. While three states, Massachusetts, New York and California, established permit guidelines, most facilities to collect and store HHW have been developed in the absence of comprehensive standards. Without specific standards, facilities have been established based on fire, OSHA, RCRA and other guidelines. Such guidelines, however, are intended to address industrial hazardous waste and do not specifically address HHW and facilities built to these standards are possibly over built

An attempt was made, for this conference, to identify areas of agreement as to the appropriate standards for facility development among the sponsors of current permanent programs. In doing so, the focus was on standards necessary to provide adequate protection of personnel and the environment for HHW and not necessarily current standards. The following is an initial attempt at developing a consensus with respect to major design features including impermeable surface, secondary containment, segregation of incompatibles, ventilation, electrical wiring and construction materials.

SECONDARY CONTAINMENT/IMPERMEABLE SURFACE

Waste must be stored in an area that provides secondary containment with the storage area surface impermeable and non-reactive with the waste. Secondary containment is often achieved where a wall meets a floor and by providing a berm or curb around the storage area. A slight sloping of the floor, perhaps into a sump, also achieves containment. Another way secondary containment can be provided is by using a raised grate floor with a containment area underneath. While concrete is impermeable by virtually all HHW, it is porous and therefor may retain residues of spilled waste. Concrete and metal coated with epoxy paint are sufficiently impermeable.

SEGREGATION OF INCOMPATIBLES

Keeping incompatible materials from commingling is one of the primary objectives in hazardous waste management and an important part of facility design and operation. Acids must be kept separate from bases and pesticides and oxidizers separate from flammables. In facilities currently in operation, this has been achieved by physically separating drums of incompatible wastes by a wall or curb, sometimes stored in different rooms. Some maintain, however, that in the case of lab-packed material, physical separation of drums is not necessary as the drum provides secondary containment if the material is kept in its original container.

VENTILATION

Ventilation is an important and necessary feature of HHW facilities, however the level provided depends on the type of facility and the waste management activities. In some instances, the natural flow of air is sufficient if the facility is somehow open to natural ventilation. Another form of passive ventilation that may be suitable in cases of smaller facilities is providing turbines that are activated by the wind. In enclosed facilities, especially larger ones, some level of active ventilation and exhaust is usually provided throughout the building. If certain wastes are to be consolidated as part of facility operations, such as paint or solvent bulking, additional localized ventilation may also be necessary.

CONSTRUCTION MATERIAL

Facilities currently in operation are constructed of concrete block, metal and even wood. Facilities close to other buildings should probably be made of fire resistant material such as metal or concrete.

FIRE SUPPRESSION

At a minimum, all facilities should have a hand held fire extinguisher available to use against small fires. Automatic dry chemical or foam extinguishing systems are also provided in some facilities. Automatic water systems could spread a flammable liquid fire.

ELECTRICAL

Although the fire code calls for explosion or spark proof wiring to be provided in flammable liquid storage areas, many program operators feel this is excessive in HHW facilities. Grounding of flammable liquid drums is a safety precaution that some facilities include.

PERMANENT FACILITY STANDARDS

- SECONDARY CONTAINMENT
- IMPERMEABLE SURFACE
- SEGREGATION OF INCOMPATIBLES
- VENTILATION
- CONSTRUCTION MATERIALS
- SAFETY EQUIPMENT
- FIRE SUPPRESSION
- SIZE/LAYOUT
- LIGHTING/HEAT/ELECTRICAL

CURRENT GUIDELINES

- UNIFORM FIRE CODE
- RCRA
- OSHA
- STATE

CONSTRUCTION MATERIAL

- CONCRETE
- METAL
- WOOD

IMPERMEABLE SURFACE

- CONCRETE
- EPOXY COATED
- OTHER

VENTILATION

- ACTIVE
- PASSIVE

SECONDARY CONTAINMENT

- CURBED AREA
- FALSE FLOOR

ELECTRICAL

- EXPLOSION/SPARK PROOF
- LIGHTING
- HEAT

SEGREGATION OF INCOMPATIBLE

- SEPARATE BAYS
- WALLS
- CURBING
- DRUMS

SAFETY EQUIPMENT

- EYEWASH
- SPILL CONTROL
- FIRST AIT
- PPE

FIRE SUPPRESSION

- AUTOMATIC CHEMICAL/FOAM
- MANUAL
- NONE

SIZE / LAYOUT

- RECEIVING AREA
- SORT/PACK AREA
- STORAGE AREA
- DISTANCE FROM OTHER BLDGS

WORK AREAS

- RECEIVING
- SORTING
- PACKING
- STORAGE

SAN BERNARDINO COUNTY HOUSEHOLD HAZARDOUS WASTE PROGRAM

Judy Orttung
San Bernardino County
Department of Environmental Health

OVERVIEW

San Bernardino County established two permanent HHW collection centers in 1985. Since then the program has grown to include five permanent collection centers and eight to ten one day collection events each year. The one day events are usually held in areas not conveniently served by the permanent centers. Occasionally, one day events have been conducted in the same area as a permanent center at the invitation of the local community as part of a community "clean-up" day. We have found that both the permanent sites and the one-day events serve a purpose and are complementary. The following discussion describes our integrated program.

Permanent sites: The five permanent collection centers are operated by other agencies under training and supervision of DEHS employees. At one location, the Collection Center is operated by employees of the County Agricultural Commissioner. The remaining four sites are operated by fire departments. (Two facilities are operated by city fire departments and two are county fire districts.) These agencies were originally sought as co-sponsors because the training and experience of their employees in handling various types of hazardous materials would reduce the amount of training required for operation of the centers and because these employees are already subject to a medical surveillance program. Expansion of the program to include personnel from other types of operations such as city yards, landfill operations and other municipal solid waste operations will require consideration of a policy for medical surveillance of workers and an expanded training program.

At each Collection Center site, employees of the co-sponsoring agency screen and accept waste from the public, make a determination as to the hazard category of the waste (based on DEHS guidelines and training) and labpack the waste by placing it in the proper drum and providing information as to date, waste type and amount on the drum log sheet. All wastes except paint, waste oil and batteries are labpacked with absorbent directly in the drum which will be used for transport to a treatment or disposal site.

The materials which are recycled (paint, waste oil and batteries) are managed as follows. Waste oil is poured into a 55 gallon drum which is inside an 85 gallon overpack to provide secondary containment. The waste oil is pumped by a waste oil recycler on an as needed basis. Lead acid batteries are stored inside the collection center, but are not placed in drums. These are picked up by DEHS personnel and taken to a battery recycler on an as needed basis. Paint (both latex and oil-based) is placed directly in drums with no absorbent. These drums are transported by DEHS personnel to the San Bernardino collection center where the paint is processed for recycling.

Under normal circumstances the paint is segregated by solvent type and the water-based and oil-based paints are processed separately. Paint processing requires opening each individual can of paint and scraping the contents into a 55 gallon drum. Mineral spirits, paint thinners, and linseed oil are consolidated with the oil-based paints.

Currently the latex paint is shipped to a Southern California paint company for reconditioning. The County is required to buy back the reconditioned paint, which is packaged in five gallon cans. Currently it costs $2.00/gallon (excluding labor) to recondition latex paint. Total labor requirements are about five hours per drum for transporting the paint to the site and emptying the individual containers.

Oil-based paints are shipped in 55-gallon drums to a cement kiln located in Lebec, California, for use as a supplemental fuel. Because of the possible presence of PCB's in oil-based paint, each drum must be sampled and tested for PCB contamination.

Round-ups: Waste management at Round-ups is generally similar to that at the permanent sites. Waste oil is consolidated into 55 gallon drums at the Round-up site. Paint is packed in its own container into 55 gallon drums without absorbent for processing later at the permanent site. Lead-acid batteries are transported individually. Only leaking batteries are packaged in plastic bags. The remainder of the waste collected at a Round-up is labpacked in 55 gallon drums with absorbent. Our current practice is to bring all wastes back to the San Bernardino site for temporary storage until waste acceptance is obtained from a TSD and the wastes may be shipped off-site. The ability to temporarily store wastes at the San Bernardino facility greatly facilitates waste management at a Round-up. Without such a facility the County would either have to pay storage charges to a commercial facility or arrange to

transport and dispose of the wastes directly from the site.

The availability of the temporary storage provides needed time to explore recycling and/or treatment opportunities.

STORAGE

Permanent site: Each of the permanent sites uses a modified "roll-off" container for storage of all wastes except waste oil. The storage area is 8 feet wide by 22 feet long by 8 feet high. Segregated storage is provided by a 6 inch metal berm inside the newer container. The original two containers have a wall built in to provide segregated storage. (The berm is preferred as it provides adequate segregation while allowing more convenience in using the storage area.) The floor area is coated with corrosion resistant epoxy and a 6 inch beam is welded to the door frames at either end to provide secondary containment. The newer storage areas also have a sump to allow for draining the area in the event of a spill. All of the storage areas are equipped with an eye wash and shower, fire extinguisher, placards and warning signs, lock and ventilation (turbine roof vents). Each storage shed could hold up to 30 drums with no aisle space. With aisle space, storage is limited to 20 drums. Because of the limitation of storage space at the San Bernardino site, a second storage container was moved to that site and is used for storage and paint consolidation. Waste oil is currently stored in 55 gallon drums stored in 85 gallon overpack drums outside of the container.

STAFF

Currently DEHS employs two professionals, two technicians, and two part time workers to manage and oversee the county's HHW program. Their tasks include weekly inspection of each collection center, ordering and maintaining all supplies, regulatory compliance (including permit applications), arranging for treatment and/or disposal of all wastes, paint consolidation, public education programs, training site personnel, and planning & staffing all round-ups. The actual day to day operations at each permanent collection site are managed by employees at each specific site who have participated in a DEHS training program.

DEHS personnel plan and staff the one day collection events including permit applications, public education, waste management the day of the event and traffic control. (It should be noted that an average turn-out for a one-day event is about 200-250 vehicles.) In addition to the HHW program, the Department of Environmental Health Services is responsible for the regulation of hazardous waste generators, emergency response and community right-to-know. Lab-packing at one-day events is performed by professionals in any one of the toxics programs since they have undergone extensive training in this area and are subject to a medical surveillance program. Other DEHS staff provide traffic control, survey, and public relations services. Generally the one-day events are co-sponsored by cities and civic groups. DEHS encourages all co-sponsors to provide staff or volunteers to assist as appropriate.

TRAINING

At the present time DEHS staff provides training to site personnel at each collection center. The training focuses on operational and emergency procedures related to the collection center with the major emphasis on determination of appropriate hazard categories for various household products. This training program was developed specifically for personnel of agencies who are receiving other training programs related to handling hazardous materials, use of respiratory equipment and right-to-know issues. As we expand our program to other types of sites we are reappraising the training program offered and will expand it to include additional topics.

Training for DEHS staff incudes the basic topics covered under the standard OSHA requirements for workers at hazardous waste sites. All professional and technical employees involved in our program are included in the same medical surveillance program as the emergency response team.

VOLUMES AND TYPES OF WASTE

Because of the way we manage waste and because we have not automated our data collection, it is difficult to separate amounts of waste collected at the one-day events versus the amount collected through the permanent centers. However, a significant amount of waste, on the order of one-third of the total collected, comes in at one-day events. In terms of relative percentages, by far the largest volume waste collected is used motor oil. This accounts for approximately one-half of the total volume. The next largest volume of waste is waste paints, thinners, and solvents. These make up about 25% of the total volume of waste. The remaining 25% is divided between pesticides, various adhesives, putty and asphalt coatings, household cleaners and other miscellaneous products. At present we are able to recycle used oil, paint, antifreeze, mercury and batteries. The remainder is shipped for treatment and/or disposal.

EDUCATION PROGRAM

A critical factor in the overall operation of the household hazardous waste program is public education and advertising. Our education program includes a variety of components. The Department has developed an HHW curriculum for grades 4-6. Our health educator continues to work on getting this curriculum into the schools within the county. Our general education program includes presentations before civic organizations, booths at local fairs and public service announcements. We view the one day events as opportunities to obtain additional press and media coverage, as well as publicity through our co-sponsors. It is easier to get press coverage for a timely event than for an on-going program which has been operating for some time. In addition to publicizing the permanent collection centers, our educational materials also emphasize waste minimization through wise buying and recycling.

PROGRAM COSTS

The 1989-90 fiscal year budget is projected at $430,000 funded by a tipping fee or surcharge of $.25/ton on waste disposed at all county landfills. Following are estimated expenditures.

Salaries & Benefits	150,000
Disposal & Disposal Related Costs	180,000
Education	20,000
Capital Expenditures	80,000
	$430,000

MINNESOTA'S PERMANENT PROGRAM

by Nancy Misra

The Minnesota Household Hazardous Waste Program began as a pilot project in 1985. In 1987, it expanded into a permanent component of the Minnesota Pollution Control Agency (MPCA) total hazardous waste program. Over the course of the past five years, we have conducted over fifty single event collections and have established five Regional Household Hazardous Waste Facilities. Minnesota's approach to the household hazardous waste issue has been a statewide one with the MPCA designated as the State Agency for carrying out the program. We have been given funding, originally as general fund appropriations, to carry out this program. Very recently (early October 1989), the State Legislature passed a recycling bill which included funding for expanding the household hazardous waste program to serve residents statewide. The funds are provided from a six percent tax on garbage collection services.

Our program is somewhat unique in that considerable funds and technical assistance support are provided by the state to local communities. However, we have recognized that a sustained long-term program requires significant commitment by the local communities. We have attempted to combine the benefits of local "ownership" of the project with state support funds and services. It appears that in the long run this model may well serve the needs of residents throughout Minnesota.

PROGRAM STRUCTURE

The Minnesota model involves the establishment of Regional Facilities (permanent sites) in counties of high population and with a high level of local interest. These counties contribute significantly to the planning process for their program. They also provide at least a half-time staff person, the location for the facility, and 50 percent of the costs for education, equipment, and waste disposal. The MPCA provides technical assistance and training in establishing and operating the site, a staff stipend, and 50 percent of education, equipment, and waste disposal costs. This is truly a cooperative venture between the state and the local community.

Once a Regional Facility is established the MPCA requires that community to solicit the participation of at least all its neighboring counties. It is through this mechanism that we are able to serve the more rural and lower population portions of the state. Participation by the neighboring counties may take many forms. They may operate through single event collections, mobile collection units, or even mini-permanent sites. The waste collected in the neighboring counties is brought to the Regional Facility for storage until the MPCA arranges for pickup and disposal.

The county housing the Regional Facility is also responsible for developing and carrying out an educational program for all its participating counties. The MPCA has many broadly applicable educational tools available for counties and other interested parties to use. These include fact sheets, brochures, learning stations for use in elementary schools, display stations, videos, slide-tape shows, and a media packet which provides details on the program and aides for making public presentations and press releases. We hope to greatly increase educational efforts over the next two years, including the development of an annual state household hazardous waste conference.

STATE NETWORK OF SITES

There are five existing Regional Facilities in Minnesota. Over the next five years the MPCA intends to add an additional five to seven Regional Facility sites. These new Regional FAcilities will be located in areas of high population and with active local interest. Counties and communities surrounding the Regional FAcility will also be asked to participate through their Regional Facilities.

To date, most efforts in the surrounding counties have been in the form of single event collections. By developing a network of 10 to 20 Regional Facilities, we can expect to serve residents of 50 to 80 greater Minnesota counties with education and collection projects. (There are 80 greater Minnesota counties and seven additional counties in the Twin Cities metropolitan area). Active program management will occur at the local level and assistance on technical issues, regional cooperation, and funding will be provided by the MPCA.

FUNDING

The Minnesota Legislature recently allocated $1.5 million through June of 1991. This money is used to develop Regional Facilities and fund six staff at the MPCA. Contracts for Regional Facilities involve the following:

1. Staff stipend for county staff;
2. Education (50 percent match with counties);
3. Equipment (50 percent match with counties);
4. Site development funds; and
5. Fifty percent of waste disposal costs.

The funds for MPCA participation come from a six percent statewide tax on garbage services. This tax also directly provides each Minnesota county with funds to be used for recycling and household hazardous waste programs. This provision of funds at both the state and local levels is critical for the overall success of the program.

CONCLUSIONS

The Minnesota model for household hazardous waste programs involves dual facets. The state (through the MPCA) generates the technical assistance and statewide coordination for the program. The local governments provide the city and county leadership and commitment to tailor the program to their own needs. Both education and collection aspects of the program are emphasized through this local/state partnership. Minnesota anticipates providing household hazardous waste services to residents throughout the state over the next five years.

Integrating Household Hazardous Waste Recycling with Collection Programs

Cindy Kling

City of Raleigh, Department of Public Utilities

The City of Raleigh held North Carolina's first community sponsored Household Hazardous Waste Collection Day on April 1, 1989. The collection day was a great success with over 1,100 citizens participating. The City of Raleigh's pilot household hazardous waste collection day had two objectives. First, to educate the citizens of Raleigh about household hazardous waste (HHW) and the proper disposal methods of such waste. Second, to collect the HHW from the Raleigh residents and to recycle some of those wastes where possible. To meet the objectives of the collection day, three key elements had to be addressed.

The key elements in developing the HHW program included legal/liability, public education and the operational plan. The legal issues that had to be resolved included, 1) whether a state permit would be required for a temporary generator, 2) additional guidelines/requirements that may be imposed by State and Federal governments, 3) what liability the City may be assuming by sponsoring a collection day, and 4) items to be included in the contract award. The public education issues included, 1) the focus of the public education program, 2) what public education materials would be utilized to publicize and educate citizens, 3) who would the citizens contact with questions about HHW, 4) who would prepare the written materials. The major issues included in the operational plan were, 1) selecting a site, 2) arranging for public safety personnel, 3) designing the traffic flow and transportation routes, 4) posting signage, 5) selecting a disposal contractor, 6) reviewing the emergency/contingency plans, and 7) working with the contractor and other interested parties on recycling some products.

Three of the materials brought to the Household Hazardous Waste Day were identified for recycling. These three materials were the good quality latex paint, used oil and automobile batteries. The good quality latex paint was given to the Raleigh Housing Authority for use in their projects. The used oil was given to Noble Oil Services of Raleigh, NC and converted into an industrial grade fuel oil. The automobile batteries were given to North State Batteries of Wilson, NC to be reused by a battery manufacturer.

On April 1, 1989, 355 drums of hazardous waste were collected and sent for hazardous waste treatment and/or disposal. Materials that were recycled included 2,800 gallons of motor oil, 105 automotive batteries and over 100 gallons of good and quality latex paint. Plans for fiscal year 1989-90 include two more collection days with an expanded recycling program.

SEATTLE-KING COUNTY HOUSEHOLD HAZARDOUS WASTE ROUND-UPS - AND BEYOND

Richard Conlin
Metrocenter YMCA
October, 1989

I. INTRODUCTION: THE PURPOSE OF ROUND-UPS

There is an increasing awareness that household hazardous waste is a major problem for America's environment. Unfortunately, many Americans are not aware of the magnitude of the problem, or that their behavior and actions are contributors to hazardous waste problems. Even for people who are aware of the problem, there are few legitimate avenues for householders to safely dispose of these substances. Because of this, persons concerned with the environment and public health have been working for the last several years to develop projects to educate the public and provide them with a disposal mechanism. The Round-Up system is a unique approach which combines education and awareness activities with collection opportunities.

When effectively implemented, Round-Ups can be the most efficient mechanism for launching a household hazardous waste program. Such a program can reach beyond the environmentally aware and committed element of the population and attract enough interest and participation to make a significant difference to the environment.

II. DEVELOPMENT OF THE SEATTLE-KING COUNTY COLLECTION SYSTEM

Seattle was the site of one of the earliest Collection Days for household hazardous substances, in 1981-1982, although this event had very limited participation. The high level of environmental awareness among both decision-makers and public in this area has spurred a continuing interest. Efforts to develop coordinated collection events were frustrated for several years by the tangled governmental framework in the Seattle area, which made it difficult to decide who would finance and take responsibility for this project. Three suburban cities, Bellevue in 1984, Kent in 1985, and Tukwila in 1986, began Collection Day programs, but these served less than 10% of County residents.

In late 1986, Metrocenter YMCA, the community development branch of the YMCA of Greater Seattle, decided that an outside catalyst would be helpful in bringing about a coordinated collection day that would serve the King County population. Metrocenter therefore initiated development of the first Household Hazardous Waste Round-Up for the Spring of 1987. With its ability, as an outsider to the governmental system, to take risks and bridge conflicts, Metrocenter was able to persuade 15 cities, King County, and several other entities to cooperate in this endeavor.

The May 1987 event was an extraordinary success, drawing over 4,000 households, more than any Collection Day held prior to that time. Since then, Metrocenter has coordinated succeeding collections in the Spring and Fall of 1988 and the Spring of 1989, serving a total of more than 20,000 households. In the course of this program, Metrocenter has established a system for conducting such events that includes a complex and sophisticated set of management and operational procedures.

III. THE KING COUNTY ROUND-UP SYSTEM (Slide Show Incorporated)

The system used in King County is designed to serve several thousand households at each event in order to reach a significant segment of the population. Under the Metrocenter system, the sites and materials collected are managed by chemical handling companies, but the vast majority of the personnel involved in the events are government and community volunteers. In the most recent event, on June 3, 1989, four sites were open and 4,733 households were served. Approximately 100 tons of hazardous substances were collected, filling 1,108 55-gallon drums.

In order to serve this number of people, 421 staff people were involved, of whom 310 were government employees and 111 were volunteers from the community. Many of these people have extensive training and experience in handling chemicals and hazardous materials, but many are simply people who are committed to environmental quality and are willing to work for it. All staff were required to attend a 3 hour session at which they were trained in site organization, safety standards and protective clothing, and waste categorization and handling. Each site also had a management cadre of 20 to 25 people, mostly with professional training in hazardous materials handling and experience at previous Round-Ups, who met three times prior to the event to plan the organization of the site.

A specific operations plan was developed for each site, consisting of two to four unloading stations, a shuttle system using carts to move materials from cars to sorting/packing tables, and a sorting/packing protocol for organizing the waste by category and ensuring that it was packed properly with compatible substances. Waste was managed using the following scheme:

- * Latex paint was sorted by usability and bulked into drums. Thirty-five of these drums will be blended and reprocessed for sale and use as recycled paint; the remainder will be tested for toxicity. If results are as expected, they will be disposed of as ordinary solid waste.
- * Oil-based paint was packed in its containers into drums. These were later crushed, with the paint extracted

and used for fuel.

- Solvents were opened and bulked for disposal as fuel.
- Pesticides, corrosives, and oxidizers were lab-packed for disposal at hazardous waste landfills.
- Auto batteries, motor oil, and anti-freeze were set aside for recycling.
- Unknowns were tested by chemists and categorized for management.

Each personnel position had a specific standard for protective clothing, ranging from half-face respirators and impermeable coveralls for solvent bulking to tyvek suits and gloves for packing oil-based paint cans.

In order to plan this kind of event, obtain and distribute the equipment, recruit and train staff, and provide adequate publicity, the event managers began work 4 months in advance, with two staff working almost full-time for 3 months.

The result of this comprehensive system has been outstanding. As noted earlier, over 20,000 households have been served, with over 150,000 items of hazardous waste collected, totalling almost 500 tons. The safety record of the Round-Ups has been excellent, with no emergencies involving staff, no major spills, and no known injuries to the public. The information and management system developed by Metrocenter has been shared at national conferences as well as with a number of other counties in Washington, including a four-county event on the Olympic Peninsula in the fall of 1988 that Metrocenter managed with the help of a grant from the Puget Sound Water Quality Authority.

Financial records have been kept for each of the four events held in King County. The initial event, in 1987, included substantial donations from companies and private organizations; since then the events have been largely financed by King County, the City of Seattle, and the Municipality of Metropolitan Seattle, the regional water quality agency. Generally costs have decreased over time by most measurements, primarily due to increased efficiency of the system and management. The following tables expand on this computation:

	Cost of Waste Mgmt	Cost/Household	Cost/Drum
1987	$132,000	$43	$206
1988 - Spring	$387,000	$49	$229
1988 - Fall	$149,000	$47	$228
1989	$185,000	$39	$167

Total Cost per Household:	Public Funds	Including Donations
1988 - Spring	$62.84	$76.67
1988 - Fall	$73.11	$79.23
1989	$62.72	$66.23

IV. ROLE OF ROUND-UPS IN HHW PROGRAMMING

Round-Ups are a superior method for initiating program activities on household hazardous waste because of their unique ability to focus the attention of the public and decision-makers on the issue. Education programs by themselves are limited in effectiveness, for two reasons. First, because the issue has low visibility with most people, education programs generally attract little attention, reaching primarily those already aware. Second, because there is so much hazardous material stored or produced in households, providing no collection opportunity at all will only lead to frustration and midnight dumping as residents become aware of the hazards and dangers involved.

Beginning activities by opening a permanent collection site also has drawbacks. While such sites provide collection opportunities, they do not easily facilitate education programs. Also, permanent sites are always available. This may be an advantage later on in program evolution, as people become accustomed to taking regular advantage of disposal options, but in earlier stages, when few people are aware and the issue is of low salience, there is a tendency to ignore something that can be used anytime. It is also difficult to obtain regular media publicity for an ongoing activity.

Round-Ups, however, provide a handle and focus around which publicity and education can be conducted, and communicate a sense of urgency about the problem. For that reason they can reach a mass audience and stimulate a greater degree of awareness and activity.

In addition, the Seattle-King County model for Round-Ups, which employs a large number of volunteers, empowers people to take control of an environmental problem, and communicates the spirit of a community working together to solve a problem. These intangible benefits are difficult to quantify, but certainly have an impact on the level of interest and excitement about the issue and program.

It is difficult to compare costs and benefits of Round-Ups held in different areas, and of Round-Ups with permanent sites and other options. This is because there are a variety of benefits to a successful program, and comparing programs requires an assessment of the relative importance of those benefits. Per drum, gallon, or ton costs are one measure of a program's relative efficiency, but are very dependent on the mix of wastes collected and the type of contract and disposal methodology utilized. A program which collected large quantities of waste oil, for example, might appear to be of lower cost than one which collected large quantities of banned pesticides, but such a program is not serving the same purpose.

Measuring the costs per household served is another useful tool for evaluating efficiency, but again focuses on the collection aspect and can vary by contract and disposal methodology.

A real measure of the utility of a program would have to include some computation of the educational and publicity benefits which the program has provided. It would also require an assessment of the extent that the program is actually meeting the public need for such a service. A program which served very few people is not an effective program, even if its costs per unit of service are low. With fairly good information that at least half of the households out there have hazardous products, and that most of those are used and disposed of without proper care, no collection/education program in existence can claim to be even approaching the level of participation needed.

Because of their intense nature, it would be difficult to meet the total public need using Round-Ups. However, effectively operated Round-Ups have in several cases (including Seattle-King County) served more people in one or two days than most permanent sites serve in a year. Clearly the optimum program mix for truly serving the population must include components of both the periodic approach and a more stable, fixed service, which is the direction in which Seattle-King County is currently headed.

V. FUTURE PLANS

The amazing response of the public to the Household Hazardous Waste Round-Ups has stimulated an array of projects and proposals to expand services and offer additional options. Washington State law now requires counties to develop management plans for "Moderate Risk Waste," which includes household hazardous waste. Political leaders have enthusiastically embraced this issue, which is popular with constituents and addresses a significant problem.

In the immediate future, governments in King County are developing several permanent sites for collection of household hazardous waste. In addition, this fall King County has launched the first of several planned mobile collection units. The Household Hazardous Wastemobile will circulate around the County, stopping for two weeks at a time in each community. Metrocenter is organizing the publicity for the Wastemobile, and will also coordinate development of education programs to be associated with the mobile collections. These programs will inform people about hazardous products and encourage them to use alternatives where available.

The Wastemobile is now at its third location. The initial location served was Vashon Island, a community served only by ferry, and which had little access to earlier Round-Ups. At

Vashon, in a two-week period, the Wastemobile served 360 vehicles, approximately 11% of the households on Vashon Island. If we can continue or increase this level of service, the annual visits to Vashon should come close to meeting the total need of that community (our rough estimate is that about 50% of families need a hazardous waste collection site, and that service every three to five years will meet those family's needs).

During the initial two years of the Wastemobile operation, various combinations of education and publicity activities will be tested to determine what is the best method of reaching the public in a cost-effective and comprehensive manner.

If participation in the Wastemobile system continues to be strong, this community centered, two-week collection option may be an effective replacement for the excitement and focus of Round-Ups, while offering some of the stability of permanent sites and the added convenience of neighborhood locations.

The Round-Ups held in King County have cost from $200,000 to $350,000 to conduct, averaging $60 to $70 per household served. While this may seem like a large sum of money, it is only about 25 cents per capita for King County's population. The County long-range plan projects that the expenditure of about $10 per capita would be needed to manage 100% of the hazardous materials produced by small businesses and households in King County.

A final project that should be mentioned is Metrocenter's proposed Hazard Free Community project. In this project, we will launch an intensive year-long campaign in a specific community to mobilize the majority of the population to change their patterns of use and disposal of hazardous materials. This project will include an education program in schools, an extended series of workshops, an active youth organization, and the involvement of businesses in their roles both as providing services to consumers and as Small Quantity Generators. The program will utilize the Wastemobile collections as the option for disposal of hazardous wastes for households. The centerpiece of the project will be a pledge campaign, in which residents and businesses will commit themselves to a set of specific responsible practices. Metrocenter is currently negotiating with the City of Kirkland, east of Seattle, to be the model community in which this program is tested. We have set ambitious goals of getting 50% of the population to sign the pledge; when this happens, we will ask the governor to make an official proclamation of Kirkland as a Hazard Free Community, and will then attempt to get the program replicated in other communities.

VI. CONCLUSION

Most of the early projects to collect household hazardous wastes served only small segments of the population. However, as research has revealed how much hazardous materials exist in households, and how many households have such materials, it has become clear that a quantum increase in the level of service is needed. The King County Household Hazardous Waste Round-Ups were among the first such events to demonstrate that truly significant numbers of people could be served in a one or two day event. In addition, the education and awareness stimulated by the Round-Ups spread far beyond those who attended.

A carefully designed and managed Round-Up program is an excellent way to involve and educate people in managing household hazardous waste problems. People are eager to have a substantive action to take to help with environmental problems, and both volunteers and public are excited and empowered by Round-Ups. Well-organized projects can serve 1 to 2% of the population in one or two days. Education is not enough; leaving people without an action alternative will simply frustrate them. A long-range program must include the availability of a variety of collection opportunities as well as education on alternatives to the use of hazardous materials and other means to prevent waste problems. King County will continue to be in the forefront in expanding its ability to serve and involve not just aware and committed environmentalists, but the mass of the population. Only by doing this will we be able to significantly reduce the pollution and environmental contamination from household hazardous waste.

The Amnesty Days Program
by Jeane White

The Florida Amnesty Days program is a state wide program funded by the Florida Legislature. In 1983 the Florida Legislature passed the Amnesty Days legislation authorizing the Department of Environmental Regulation to sponsor the program. Amnesty Days is funded out of the water Quality Assurance Trust Fund, a fund that is generated primarily by tax on petroleum products. The Water Quality Assurance Trust Fund also funds programs such as the Emergency Response and Super Fund Clean-up programs.

Amnesty Days was the first statewide program designed to assist homeowners, schools, farmers, government agencies and small businesses by providing free disposal for up to 100 pounds of hazardous waste from each participant.

The first Amnesty Days program began in 1984 and by 1987 had conducted collections in all 67 counties of Florida. More than 1.5 million pounds of hazardous waste was collected from over 12,500 participants without incident. The success of the program made it a national model for dealing with household and small quantity hazardous waste problems.

The 1988 legislature reauthorized the DER to conduct Amnesty Days throughout the state once again. Senator George Kirkpatrick sponsored this legislation as well as the original program in 1983.

Amnesty Days will take almost 3 years to hold the series of collections that will go to each of Florida's 67 counties. The first round of collections began in March of this year and were completed in the Southern portion of the state in June. Amnesty Days collected more than 1.1 million pounds of hazardous waste from over 11,800 participants in only 13 counties. Comparing this second sweep of the southern portion of the state (13 counties) to the first sweep of the entire state we collected almost as much waste from slightly less participants than we did in the entire state during the first sweep of Amnesty Days collections. Collections are currently being conducted in the central portion of the state and will be completed in April 1990. The North Florida Counties will be addressed beginning in August 1990.

A very important aspect of the new Amnesty Days program is that it is being conducted in partnership with the counties and local governments so that increased awareness and knowledge are transmitted to the community.

The Amnesty Days staff works very closely with the individual counties to help assure that each county's specific needs are addressed during the collections and that local and county representatives gain the necessary experience to help address long term hazardous waste solutions for their communities.

The Amnesty Days program

The Amnesty Days program organizes together, with the county all details concerning the collection, i.e. recycling materials such as motor oil, batteries and latex paint; media involvement, distribution of Educational materials, volunteers, and any surveys that may be taken at the collection.

The number of days and sites in each county depends on the population of that county. Most counties in Florida have at least two locations of collections and at least two days at each location. Some of the more populated counties may have as many as 4 locations for collection. For instance Dade and Broward counties having a population of over 1.1 million had four locations and two days of collections per location.

The Amnesty Days program has been extremely successful. One of the primary goals of the program was to educate the citizens of Florida. The program has had a continuous educational program for five years and we feel that education has been the contributing factor in the success of the program. In Sarasota county in 1985, 93,343 pounds were collected from 523 participants and in 1989 Amnesty Days collected 189,158 pounds from 2,556 participants. Amnesty Days feels that educating our citizens is the key to a safer and cleaner tomorrow.

Along with education, Amnesty Days has four other main objectives.

- To give Florida citizens a way to dispose of hazardous material and to collect significant quantities of these materials statewide
- To purge surplus or unwanted chemicals from school laboratories
- To assist in developing future hazardous materials strategies and encourage development of facilities to properly manage the wastes we all generate
- To demonstrate to the public that hazardous waste can be safely and properly managed

HHW WITH SQGS AND CONDITIONALLY EXEMPT GENERATORS: RCRA ISSUES

Kathy Margolis
Environmental Protection Specialist
Municipal Solid Waste Program
United States Environmental Protection Agency

In continuation of EPA's support for household hazardous waste collection programs, I would like to take time today to clarify a number of issues raised recently regarding RCRA permit requirements for collection programs accepting small quantity generator waste. In particular, I would like to clarify RCRA permit requirements for the following:

- o HHW collection programs accepting HHW and hazardous waste generated by "conditionally exempt small quantity generators", and
- o HHW collections programs accepting HHW and 100-1000kg/mo small quantity generator waste.

RCRA Small Quantity Generators

To determine the applicability of RCRA permitting requirements to collection programs in these two situations, it is necessary to define the terms "conditionally exempt small quantity generator" and "100-1000kg/mo generators". These definitions are provided at 40 CFR Part 261. Under these definitions:

"Conditionally exempt small quantity generators" are generators of no more than 100 kg of hazardous waste and no more than 1kg of acutely hazardous waste in a calendar month who comply with 40CFR 261.5, and

"100-1000 kg/mo generators" are generators of more than 100 kg and less than 1000 kg of hazardous waste and no more than 1 kg of acutely hazardous waste in a calendar month.

Permit requirements for a collection program accepting wastes from either of these generators is based upon a number of considerations, including ultimate treatment/destination of the HHW once the waste is collected.

RCRA Requirements for HHW Collection Programs Accepting HHW and Hazardous Waste Generated by Conditionally Exempt Small Quantity Generators

As you know, all household wastes are exempt by definition from the Federal hazardous waste regulations promulgated under Subtitle C of RCRA. Section 261.4(b)(1) unconditionally exempts household wastes, including HHW, from Subtitle C regulations, even when accumulated in large quantities. This exemption also applies to HHW collected by an HHW collection program.

Under 40 CFR 261.5(f)(3) and (g)(3), conditionally exempt small quantity generators, must ensure that waste sent off-site is sent to a treatment, storage, or disposal facility in the U.S. that is: permitted or is in interim status; is in a State that is authorized under 40 CFR Part 271; and, is permitted by that State to manage municipal or industrial solid waste or is a facility which (A) beneficially uses or reuses, or legitimately recycles or reclaims its waste, or (B) treats its waste prior to beneficial use or reuse, or legitimate recycling or reclamation.

However, the regulations do not require conditionally exempt small quantity generators to deliver their waste directly to a facility meeting these requirements. Neither do the regulations require persons packaging or transporting conditionally exempt small quantity generator waste to have an EPA identification number. HHW collection programs, therefore, that send collected waste to a treatment, storage, or disposal facility meeting one of the above requirements, may accept conditionally exempt small quantity generator wastes without obtaining a RCRA Part B permit.

However, when household wastes are mixed with conditionally exempt small quantity generator waste, this resulting mixture can lose its exemption from hazardous waste regulations. (40 CFR 261.5(h)). For this reason, sponsors of HHW collection programs must not mix HHW and conditionally exempt wastes, thereby triggering all or some of the Subtitle C requirements for management of this waste.

RCRA Permit Requirements for HHW Collection Programs Accepting HHW and 100-1000kg/mo Small Quantity Generator Waste.

Generators of more than 100 kg and less than 1000 kg of hazardous waste and no more than 1 kg of acutely hazardous waste in a calendar month must properly package and fully manifest their wastes and send them to a permitted or interim status Subtitle C facility when treating, storing, or disposing of waste off-site. These generators are also required to use a transporter who has obtained an EPA identification number. Therefore, unless an HHW collection program has a RCRA Subtitle C permit, or is a transporter and can qualify for the transporter facility exemption (40 CFR 263.12), it may not accept 100-1000kg/mo small quantity generator wastes. For this reason, sponsors of HHW collection programs should be careful to limit the participation in their programs to households and conditionally exempt small quantity generator waste.

In addition, although HHW is exempt from the Federal RCRA Subtitle C hazardous waste regulations, EPA recommends that sponsors of HHW collection programs manage the collected HHW as a hazardous waste. The Agency also recommends the use of hazardous waste transporters who will properly identify, label, manifest, and transport the collected wastes for recycling, treatment, or disposal. It is important to note, however, that the responses provided above apply to Federal requirements for conditionally exempt and small quantity generators; conditionally exempt and small quantity generators in some States may be subject to more stringent requirements including full regulation under Subtitle C where a State does not have a small quantity generator exemption.

I hope this clarification helps you address questions you may have regarding the status of HHW collection program requirements for receipt of small quantity generator waste.

SCHOOL SYSTEMS AND CONDITIONAL EXEMPT SMALL QUANTITY GENERATORS; HOW THEY NEED YOUR PROGRAM

by Kean Jalowy

One of the main objectives of a household hazardous waste (HHW) program is to reduce the amount of hazardous waste (HW) being released into the environment. To effectively accomplish this task, the HHW program coordinator should investigate an economical means of incorporating Conditional Exempt Small Quantity Generators (CESQG) and in some cases school systems into your program. This presentation will explore suggested mechanisms for accomplishing these tasks.

First: School Systems

The reason schools systems are an issue is they do not realize or in some cases acknowledge that a HW problem exist until you bring it to their attention. Years of out dated Lab chemicals sit on shelves. Rusting old drums full of unknowns sit outside of maintenance yards unattended. Why? Generally most school systems leave the administration of hazardous materials to each individual school. Each school buys and handles their own chemicals usually on recommendations from their science teachers without regard to ultimate disposal. These teachers retire and the school is left with shelves of substances that could be twenty years old. School maintenance has similar problems.

Your main goal is to make the school system handle their own HW. This is best accomplished when the school system centralizes the administration of hazardous materials. One person or one group has control over all handling of such materials for the entire system. The central control systems seems very effective. Waste exchange is utilized making one school's waste another schools useful chemicals. Also it can restrict school from purchasing materials that should not be used in a classroom setting.

To do this start at the top. Contact the Assistant Superintendent in charge of Facilities. Insist that the Superintendent appoint someone who will represent the entire school system. Do not work with individual schools. This will make management aware of the whole systems problems. Final result will be the acknowledgement by the school board of the problem. They will budget for it and handle the problem on their own. This is your ultimate goal.

How to get the schools involved - How to get their attention:

You can offer them cooperative service, disposal at a reduced rate or offer them some free waste disposal. Something to entice. Something to get your foot in the door. But take caution about accepting waste from schools. Require any substances handled at a site to be inventoried and submit that inventory to you or your HW service company for review. Generally, you will find that schools will have the most dangerous and exotic chemicals handled anywhere.

Last point:

If you local school system already properly manages their waste, leave them alone. Save your money for other disposal problems.

Helping CESQG:

First, what universe of industries are we considering. Basically, my feeling is 90 to 99.5 percent of all businesses fall into this class, if you count each entity as one. Although most of these businesses do not generate HW on a regular basis, some do. Examples are: Dry Cleaners, Gas Stations, Paint and Body Shops, Jewelers, Pharmacies and Farmers. Look around your community and you will begin to realize the number of businesses generating these wastes. These businesses need a economical disposal mechanism for their waste. If you cannot provide them with one, we can only assume what happens to the waste.

The cost of doing business with hazardous waste service companies usually requires a minimum fee for any HW pick-up large or small (e.i. $300 minimum for a "milk run" or $1000 minimum for special pick-ups). For many CESQG this is not an affordable means of waste disposal. Therefore, to keep these wastes from being improperly disposed of, I feel a HHW program should include CESQG in a good management program.

How to accomplish this task:

1. The "Milk Run" approach: Meet with your business community and locate all business that generate waste on a regular basis. Work out a schedule with a service company to hit all businesses with one run. Remember, this still will cost a business approximately $300 minimum charge.

2. The "Cooperative Services" approach: In Florida, this is the most common approach. Businesses bring their waste to one of your one day HHW collection programs. Your HW service company deals directly with the business at the site. All waste is then packed and disposed of under the Business' name. This seems to be more cost effective for the business than the "Milk Run" approach. The service company does not have to pay transportation cost to the business and your HHW program is usually picking up the labor charges for packing and manifesting the waste.

3. The "Special Day Services" approach: Since you usually have contracted with a service company for your program, try to incorporate a "Special Day" into the contract. This is when the service company comes to a site at no charge to you and all CESQG bring their waste on that day. Rates should be cheaper than the "Milk Run"; however, the service company must charge labor costs to the business running the tab higher than most "Cooperative Services".

4. Incorporate CESQG waste stream into you HHW stream: This is a new idea which to my knowledge is untried. However, the numbers indicate vast savings could be realized for the CESQG and for your program.

RCRA regulations require CESQG to insure proper disposal of the waste. That is their only requirement. Therefore, if you are treating homeowner waste as "HW" in accordance with RCRA guidelines, (i.e. you are a HW generator) you may assume possession of CESQG waste as the generator of that waste. The CESQG can receive a receipt for the waste proving proper disposal using your program. Remember, this method can only be utilized if you dispose of your HHW as a "HW" as defined by RCRA.

The cost savings for the CESQG is very dramatic. Making it worth your time to investigate this process. (Refer to Figure I) For example, a CESQG brings two gallons of a HW requiring incineration. Using the "Cooperative Services" system the cost would be approximately $242.84. (Refer to Figure II) However, if you were to "Incorporate", the usual 55 gallon lab pack contains 15 gallons of waste. The lab pack costs your program approximately $469.50 to handle. Charging the CESQG for 2 gallons of that lab pack or 2/15 of the cost of a 55 gallon lab pack, the cost comes to $62.60.

The difference in cost really stands out. $62.60 for "Incorporated" versus $242.16 for "Cooperative Services".

This type of disposal method cannot always be accomplished as easily as this example. It may take time to calculate costs on the many different types of waste streams that will come to you. However, the cost difference is so dramatic, I suggest giving it a try.

Summation:

- Try to encourage school systems to centralize their supervision of handling hazardous materials.
- Make an effort to include CESQG into your HHW program by:
  - Milk Runs
  - Cooperative Service
  - Incorporating their waste stream into yours.

FIGURE 22.a

Cost associated with 2 gallons of a hazardous waste from a CESQG.

Method: "Cooperative Services"

Process: Requires two 5 gallon Lab packs to be incinerated.

Labor Time Estimate:
(from Amnesty Days)

Identify Substance and Quote Cost	20 minutes
Billing and Labeling	20 minutes
Packing and Labeling	15 minutes
Manifesting and RCRA Certification Paperwork	30 minutes
Total Labor Time:	125 minutes (1.42 hr.)

. . . .

Total Cost:

Containers (2 X $10.50 per container)	$ 21.00
Packing Materials (1/3 of a bag of vermiculite X 2) (at $10.50 per bag)	7.00
Labeling and Manifesting (materials only at $2.00 X 2)	4.00
Disposal and Transportation Cost (incineration at $70.00 per 5 gallon Lab Pack)	140.00
Labor Cost (1.42 Hours X $50.00 per hour)	70.84
Total Cost:	$242.84

FIGURE 22.b

Cost associated with 2 gallons of a hazardous waste from a CESQG.

Method: "Incorporation"

Process: Requires the space of 2/15 of a 55 gallon Lab pack.

Labor Time Estimate:
(from Amnesty Days)

Packing and Labeling	50 minutes
Manifesting and Costing (estimateed per drum)	10 minutes
Total Labor Time:	60 minutes (1 hour)

....

Total Cost:

Containers (1 X $37.00 per container)	$ 37.00
Packing Materials (1 of a bag of vermiculite) (at 10.50 per bag)	10.50
Labeling and Manifesting (materials only at $2.00 per)	2.00
Disposal and Transportation Cost (incineration at $370.00 per 55 gallon Lab Pack)	370.00
Labor Cost (1 hour at $50.00)	50.00
Total Cost:	$469.50

CITIZEN, GOVERNMENT AND PRIVATE SECTOR COOPERATION FOR A HOUSEHOLD HAZARDOUS WASTE PROGRAM IN MONROE COUNTY, NY

Alice Young
League of Women Voters Rochester Metro
Monroe County Environmental Management Council

Monroe County, in upstate New York held its first household hazardous waste collection day on October 21, 1989. The day was overcast with a threat of rain. The temperature was in the mid-thirties all day. Hazardous wastes from 1400 households in the County were collected and properly disposed of. One can only estimate how many more residents could have been served. My guess is that if we had the money to hold another collection next week people would again come in large numbers. The site opened at 9 AM and closed at 2 PM. Lines formed as early as 8:20 and at 1:15 PM a number had to be turned away. However we were able to process 280 residents per hour, and that breaks down to more than 4 residents per minute. Forty volunteers worked in a variety of jobs; from traffic control and handing out and collecting forms to distributing of educational materials and meeting, greeting, and acknowledging the participants, spreading the message that they were contributing to a cleaner environment. The numbers of participants caused a few frayed nerves because of backed up traffic but the overwhelming response was that the collection was a great idea.

Susanne Quarterman, Environmental Management Council, chaired the committee that planned and executed the day. The Division of Solid Waste carried out the details of site planning and its administrator, Paul Wendelgass, was the Site Coordinator. The City of Rochester allowed the County the use of its excellent facility. Chemists from the County Health Department's Environmental Health Laboratory, sampled and handled the used oil and auto batteries. The HAZMAT team was on site all day. The bomb squad was also on call. County and City police as well as hospitals were notified about the day's proceedings. Publicity prior to the collection day was done through newspapers, TV, radio, flyers, and slide shows. Sixty-two thousand dollars was allocated from the County, five thousand dollars from the City of Rochester, and fifty-seven thousand dollars donated by local industry and business. Add to that substantial donated services by Eastman Kodak and many other corporations and small businessess. All of the plans were coordinated with the many entities involved by Monroe County.

The County contracted overall management with Northeast Solvents. Twenty-four of their employees, including fourteen chemists set up, identified, packed and transported the wastes, removing 681 barrels from the site. Rochester's largest industry, Eastman Kodak Company donated the use of its high temperature chemical incinerator for destruction of solvents and oil based paints. Used oil recovery services were donated by Safety Kleen. Auto batteries were sold to Genesee Scrap and Tin Baling Company Inc., a local recovery company. Six tons of trash was taken to the landfill.

The purpose of the collection day was to reduce environmental contamination, reduce public health risks and encourage awareness about proper handling and environmentally safe disposal of hazardous household products.

Since the title of my talk is "Citizen, Government and Private Sector Cooperation for a Household Hazardous Waste Program in Monroe County, NY," perhaps, at this point I should tell you some personal information about how a citizen like me becomes involved in these issues. My background in environmental issues has been primarily with the League of Women Voters Rochester Metro. I was their Natural Resources Director for a number of years. Much interaction and education occurs between government, industry, and citizen groups with the League. So my presence at this conference is as a citizen volunteer supported by the conference organizers and the Rochester League of Women Voters.

In 1983, as a solid waste neophite, I was asked to represent the League on the recently formed Monroe County Landfill Advisory Committee. Concerns within that committee about groundwater contamination caused by improper disposal of hazardous products elicited my interest. Meanwhile, efforts were underway in Monroe County to sponsor a collection day. Two different groups, the Rochester Engineering Society, and the County Legislature's Household Hazardous Waste Task Force studied the issue and made recommendations. Also, Eastman Kodak worked with the County on a possible collection day. All these efforts were aborted because of real or perceived road-blocks. Liability was not the least of these. However, politics was a major component in the process. A change in the County Administration refocused certain attitudes toward environmental decision making. The time was now right.

As the Rochester League's representative on the Environmental Management Council's Solid Waste Committee, discussion and concern about household hazardous materials in the waste stream prompted the formation of the Household Hazardous Waste Subcommittee. I was asked to chair the subcommittee. Eighteen months ago six concerned citizens sat down together to see whether we might work through the maze of issues that had led to the repeated failure in rallying sufficient support for a program in the County.

I chaired that group of five people. Our meetings began in April 1988. We began the process as all such groups begin; gathering the known materials and reading. We sent for more materials from states and municipalities, from Washington, California and Arizona in the west to Massachusetts, Connecticut and our own New York State in the east. We also read documents from Japan, Sweden and Denmark. Eventually, interest grew and more people joined the committee, we were now 12 in number. We began to come to a consensus and this is a very League-like thing to do. Persons on that committee represented the Environmental Management Council, the League of Women Voters, the Monroe County Legislature, Adirondack Mountain Club, Cornell Cooperative Extension, Federation of New York State Garden Clubs, City of Rochester Environmental Commission, County Health, Center for Environmental Information, and the City of Rochester Environmental Services Department. Three of us attended the 1988 Household Hazardous Waste Conference in Boston. Eventually the committee wrote a recommendation to the Monroe County Legislature, which was endorsed by the Environmental Management Council. Our recommendation encouraged the County to sponsor a household hazardous waste collection and to develop an educational program relating to household hazardous waste. The Legislature accepted the recommendation without exception in March 1989.

Next would come the issue of funding by the County. The League invited Dana Duxbury to speak at a meeting to address issues pertinent to household hazardous waste. That meeting was very well attended. Coverage on local radio, TV and the newspapers spread the word. Three county legislators brought the issue to the Public Works Committee. Both sides of the aisle supported a program and we were on our way!

The next phase was to develop a county staff planning group. Susanne Quarterman led the group of county professionals from solid waste, planning, health, law, fire, legislature as well as representatives from the original citizen EMC group. This group met twice a month but as we got close to the collection date we met weekly. Some county staff worked daily. To be truthful, it began to consume all our lives.

A major county budget deficit of more than $30 million brought concern to us. However, solid waste continued to be a high priority issue for both County Executive Tom Frey and Solid Waste Administrator Paul Wendelgass and support did not falter. Meanwhile, the request for proposals (RFPs) were sent out. And that was no mean task for the newly appointed head of the Environmental Management Council. Samples of RFPs from other counties for a household hazardous waste collection were few and far between. Information sharing was not forthcoming. Finally the RFPs were sent. Proposals were received from a number of contractors and Northeast Solvents was chosen. The county planning staff person wrote the plan and that was sent to the New York State Department of Environmental Conservation. Negotiations between all the parties became extremely complicated. Furthermore, contracts were negotiated between the County, Northeast Solvents, City of Rochester and Eastman Kodak. In order to save money, bulking of some of the materials was requested by the County, i.e., paints and solvents. The Kodak incinerator could not, under permit regulations, incinerate large drums with high BTUs. Other negotiations and work on details too numerous to mention followed.

The collection day itself, went smoothly, the operative word being "hustle". Everyone on the site had a well defined job and each person found it necessary to be as efficient as possible because of the numbers of people who came. We collected 80,000 pounds of chemicals, 3,000 barrels of used oil, and 13,375 pounds of auto batteries. Surveys by the participants indicate that as a group they tend to be mature, married, living in a two-person household, with higher than average incomes and education. The participants learned about the collection more by newspaper than other media, drove about 11 to 20 miles to the site, and finally most would brave the cold and the wait to dispose of their wastes again.

Last year, at the 1988 Household Hazardous Waste Conference in Boston I heard many times, "Don't reinvent the wheel!" But, truly, I can't think of doing it any other way for a first time event. All the things we did in Monroe County, were built one upon the other. I can't think of a single step we could have eliminated. Citizen groups, government and the private sector need to understand the issues before building a constituency. The issue may be generic but the positive interactions among citizens, the government, industry and business are vital to successful household hazardous waste programs.

No, we didn't have a perfect plan nor a perfect collection program, but we view October 21 as a very good start. We recognize that a lot more education needs to be done to inform people about the consequences of their purchases of hazardous products. Alternatives to those purchases and reuse, recycling options should be a priority. our citizen committee will be working on a series of informational fliers on the categories of household hazardous wastes.

When all is said and done, we do feel that our collection day did make an impact. We take some satisfaction from the fact that Monroe County is already discussing a permanent facility for household hazardous waste in 1990.

Industry Sponsored Programs

Joseph Lindsly, Dow Chemical USA

Dow Chemical has been involved in HHW management programs since 1984, when it began sponsoring or assisting programs where the company has major facilities in Texas, Louisiana, and Michigan. In Michigan, Dow began sponsoring one-day annual HHW collections in 1984 which service Bay City, Saginaw and Midland. In 1987, the program expanded to five collections per year with a reduced role for Dow in program implementation.

Initially, Dow provided services for HHW collection in Michigan which included:

- o Providing trained people to collect, package, and prepare HHW for transport and off-site management
- o Publicity
- o A program for fifth and sixth graders in schools in the three areas where Dow holds its collection programs.
- o Waste hauling
- o Treatment/disposal of collected waste.

Dow has since modified its approach for assisting communities in Michigan through what Dow considers a partnership with communities involving shared responsibilities. This approach by Dow includes:

- o Working with the League of Women Voters, local environmental and sports clubs, and other community groups
- o Working with the state (Clean Michigan Fund) which supports unique environmental projects
- o Supplying experience, transportation/disposal assistance, and training for HHW collections.

Dow continues to sponsor and fully fund annual collections in Texas and Louisiana, and provided a site and engineers to assist a community sponsored collection in Allens Point, Connecticut. In Michigan, the Dow-assisted HHW collections receive waste from approximately 600 households each year. In total, Dow Chemical, USA has spent approximately $300,000, and collected close to 250 million pounds of HHW since 1986 at its HHW collection programs throughout the country.

FIGURE 23.a

Household Hazardous Waste

- Training
- Communications
- Industry programs

Household Hazardous Waste
Dow Sponsored Events

Michigan	(1984 - 1989)
Louisiana	(1985 - 1989)
Texas*	(1985 - 1989)
Eastern	(1988 - 1989)

*No program in 1988

Household Hazardous Waste

Companie$ Sponsoring Collection Days

- Arco
- GSX
- Hercules
- Kodak
- Monsanto

Household Hazardous Waste
Household Participation

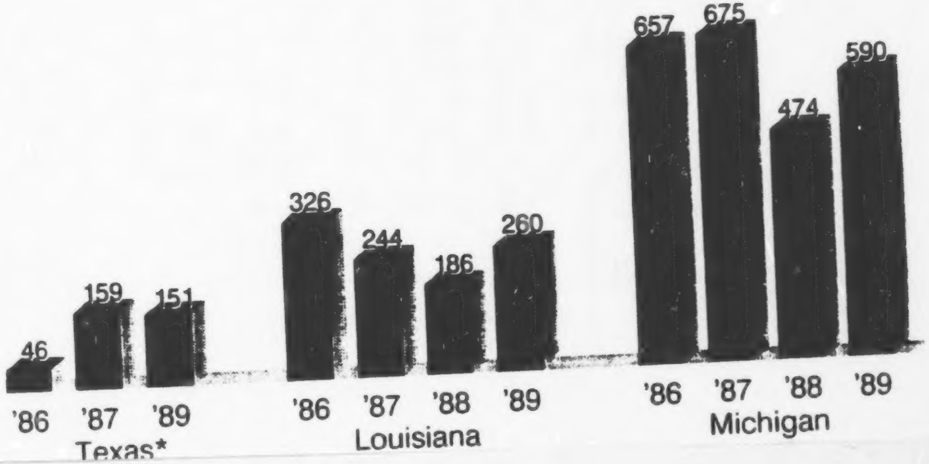


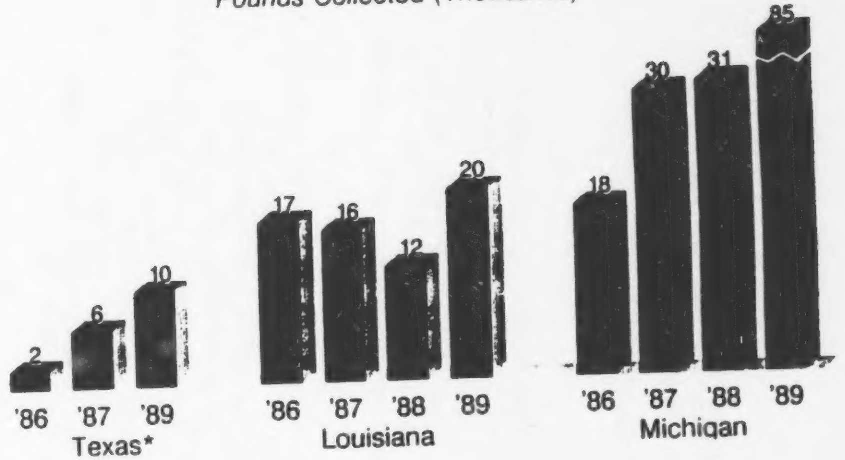
FIGURE 23. b,c,d

Household Hazardous Waste

Waste Category	Materials Collected	Michigan Wt %	Texas Wt %
Paint Products	Paint	32	43
Automotive Products	Oil Solvents Batteries	22	40
Gardening Products	Insecticides/Pesticides	20	7
Household Materials	Cleanors Hobby	26	3
Miscellaneous			7
	Total	100	100

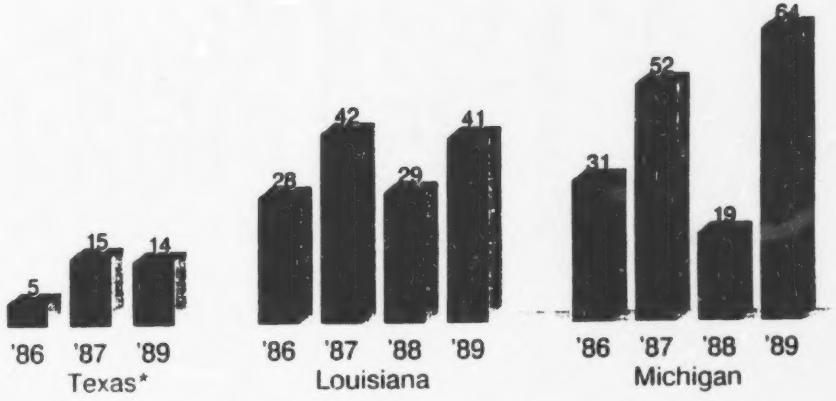
Household Hazardous Waste

Pounds Collected (Thousands)



Household Hazardous Waste

Cost ($ Thousands)



*No program in 1988

Household Hazardous Waste

Why Be Involved?

- Matches Waste Management Practices
- Promotes awareness
- Community service
- Pro-active involvement

Cleansweep Orangeburg County

An Agricultural/Household Hazardous Waste Educational Program

Jesse C. Eargle and Charles W. Davis

Rationale for the Program

"Out of site-out of mind!!" How many times has this phase been applied to difficult and controversial educational issues facing County Extension Offices across the country? When these issues show their ugly face do we tuck our tails and run? No!! Our mission is to assist citizens in identifying educational needs and to provide practical information and educational programs to meet those needs.

During early 1988 the need to educate the citizens of Orangeburg County on the controversial issue of hazardous chemicals and wastes became apparent after numerous calls and requests for information. After careful study we determined that the potential dangers of carelessly storing and discarding agricultural/household hazardous chemicals and waste could include personal injury, pesticide poisoning, county landfill leeching, ground and surface water contamination, damage to sewer systems and septic tanks and threats of fire. These dangers and risks should be a concern for all the residents of Orangeburg County.

We also determined that the general public as well as many agriculturists did not understand the health and environmental risks and liabilities associated with the improper storage or disposal of hazardous wastes.

To our dismay we found very little educational support materials in which to conduct a hazardous waste educational/collection program.

Teaching Objective

The Orangeburg County Extension Office, through our community service efforts, established the program entitled "Cleansweep Orangeburg County" to educate the residents of Orangeburg County on the dangers and concerns of hazardous chemicals and wastes and to offer a program to collect and properly dispose of these products and materials.

As stated above, our goal included two separate objectives -

Jesse C. Eargle, County Extension Director
Charles W. Davis, County Extension Agent
Orangeburg County Extension Service
P. O. Drawer 1206, Orangeburg, SC 29116

Teaching Objective, continued

a public information program and a hazardous waste collection day.

Program Planning

The study of local hazardous wastes concerns and problem identification was completed in early 1988. There was total agreement by agents and advisory committees to plan, develop and implement a hazardous waste educational program for the residents of Orangeburg County.

Program development began in March, 1988. Various agencies including the Clemson University Agricultural Chemical Service, the S. C. Department of Health and Environmental Control, and the Clemson University/Medical University of S. C. Agromedicine Program were contacted for information, regulatory assistance and suggestions.

In May, 1988, GSX Chemical Services, Inc. was contacted and agreed to co-sponsor the program and provide technical assistance, personnel, equipment, packaging, and disposal of all hazardous wastes collected during the collection program. The collection date, December 3, 1988, was selected to prevent conflict with fairs, sporting events, or holidays.

Program development/planning continued during June-November, 1988. Monthly planning sessions were held involving all participating agencies. DHEC agreed to provide personnel on site during the collection day program and to issue generator identification numbers to individual farmers if necessary, using a simplified format and record keeping requirements.

The public information program began in early October, 1988, and continued until December 3, Cleansweep Orangeburg Day.

During the last week of November, prior to the collection day, a final logistical/planning session was held involving the Orangeburg County Extension Office, GSX Chemical Services, DHEC, the Orangeburg City Department of Public Safety, the Crandall Corporation, the Orangeburg County Department of Disaster Preparedness, and Orangeburg County Extension Homemakers.

Cleansweep Orangeburg Public Information Program

The public information objective - to educate the citizens of Orangeburg County on the health and environmental issues associated with the improper storage and disposal of hazardous chemicals and products - began in early October, 1988.

This educational program contained a variety of methods to accomplish our goal. The following were various components of the public information program:

- Presented educational programs and information to various civic/agricultural groups to include - The Four Holes Grange, the Farm-City Breakfast Banquet, The Orangeburg Area Cattlemen's Assoc., the Orangeburg Area Pork Producers Assoc., the Orangeburg County Young Farmers, the Orangeburg Kiwanis Club, the Orangeburg Lions Club, the Orangeburg County Fire Marshall's Assoc., and the Orangeburg County Chamber of Commerce Early Bird Breakfast.

- Presented the goals, objectives, and scope of Cleansweep Orangeburg to the Orangeburg City Council and the Orangeburg County Council. Both governmental groups passed resolutions in support of the program.

- Mailed educational material to the Orangeburg County Extension Office's general mailing list and agricultural mailing lists, and to the Orangeburg County Chamber of Commerce mailing list.

- Delivered educational posters and fliers to merchants/businesses in all Orangeburg County municipalities.

- A series of four educational news articles and support materials were printed in the Orangeburg Times and Democrat, and the Holly Hill Observer.

- Educational news articles were also printed in the State, the Greenville News, the North Trade Journal and the Santee Stripper.

- Taped a feature T.V. story which was broadcasted on the 7:00 P.M. and 11:00 P.M. WIS-TV news programs.

- Taped a feature educational radio announcement which was aired daily by WORG, a local radio station.

- Taped a feature T.V. story for the Orangeburg Cable T.V. News program called "Orangeburg Today"

"Cleansweep Orangeburg" Hazardous Waste Collection Day

December 3 turned off cold and clear, and putting up the three tents was done quickly just to get warmed up. Emergency personnel were on hand and the site opened at 9:00 A.M.

Farmers and homeowners entered the south end of the Orangeburg County fairgrounds and were met by 4-H'ers who assisted them with a survey to determine program impacts and statistical data about participant's feeling on hazardous waste. Each participant was given a packet of information on waste disposal and alternatives. Included were a Household Hazardous Waste Wheel, a Pesticide Poisioning Information Card, a Meet the Browns Booklet, and a list of contributors and reminders on how to minimize hazardous waste.

GSX personnel were in charge of handling the chemicals once they arrived. No homeowners/farmers were allowed to unload their products for liability reasons. Persons in direct contact with chemicals were clothed in disposable suits and usually wore respirators around most of the chemicals. Rubber gloves were a must.

Several problems cropped up early. First, farmers and homeowners often had chemicals in containers with no labels. At this point the guessing game began...what does it look like, smell like, feel like? Is the container like the one we received on the last truck? If so, maybe its the same chemical. The problem here is that a positive I.D. must be made before it can be legally transported and disposed of. The Farm Chemicals Handbook is an absolute must! Often only a fragment of a label is left, and "20 questions" is the only way to be sure what chemical it is.

Another problem is that of products that are not in their original containers. This poses the same type of problem mentioned above.

A major portion of my time was spent identifying chemicals as to their types and uses. Which were herbicides, insecticides, fungicides...etc. We received a surprising variety of chemicals. For example, we received over 350 lbs of DDT, over 65 gal. of Toxaphene, over 13 gal. and 60 lbs. of mercury compounds, over 20 gal. of Dynap, over 30 gal. of Dinoseb, over 55 gal. of arsenicals, fifteen gal. of Lannate, and over 20 lbs. of Mirex, just to name a few. We were disappointed in the number of farmers and homeowners who turned out, but the quantity of chemicals was amazing. Seventeen households and 29 farmers responded to the program, but 78 containers of waste (55 gal. and 20 gal. containers) were packed by GSX. The total quantity of liquids was @610 gallons along with 1253 lbs. of granular materials.

"Cleansweep Orangeburg" Hazardous Waste Collection Day, continued

This averages out to 13.26 gal. and 27.5 pounds of chemical waste per participant. If just half of the 1000 farmers in Orangeburg County have the average disposable chemicals that would be 6630 gallons and 13728 lbs. of hazardous chemical waste still sitting in Orangeburg County barns. This is scary when you consider the condition of many of the containers we saw on Dec. 3.

DHEC officials were on hand all day to make determinations on which farmers qualified as large quantity generators (those having more than 2.2 lbs of a P listed chemicals). LQG's had to have their chemicals individually packed and manifested.

Containers were packed and labeled for transport to the GSX Transfer Station in Reidsville, N.C. From there, wastes were routed to disposal destinations in Louisana, Arkansas, and South Carolina. By volume,

20.5% went to Louisana
19.3% went to Arkansas
58.3% went to inceneration in South Carolina
1.6% went to burial in Pinewood, South Carolina
.2% went to fuel at Giant Portland Cement in S.C.

We were fortunate to have the first program of this kind in the state. GSX chemical services provided the manpower, expertise, hauling and disposal at no cost to the citizens of Orangeburg County. I regret that more citizens did not take advantage of a "free" opportunity that may never be repeated. Crandall oil as well presented a "free" opportunity for our citizens. The value of services provided was $38,500.00. As you can see hazardous waste disposal is not cheap. When you see the amount of care and paperwork required in this business you can almost understand why it isn't cheap. Pesticides are one of the most expensive hazardous waste to dispose of.

Unlike collection days in other states where oil, paint, and batteries make up over half of the volume collected, only 3 batteries, 30 gallons of paint and 20 gallons of oil were collected. Even among the household contributors, pesticides were the main disposal products. This raises serious questions about the outlook for the environmental safety of Orangeburg County. Where is all the used oil going? Where are all the old farm chemicals going? How much can our landfill stand before problems begin to show up?

What about the chemicals we cound not accept? The dioxins 245-T, Silvex, unidentifyable chemicals and penta compounds.

Where will they end up. These are serious questions that weigh heavily on our minds when we consider the amount of chemical wastes still left in the county. We hope the state and county governments will address these questions in the very near future.

Orangeburg County is off to a good start. We hope we have made the way a little easier for the rest of the state.

Where Do We Go From Here. What's Next!!

"Cleansweep Orangeburg" was successful by making Orangeburg County homes and farms safer for families, by minimizing the danger of contamination and by making the residents of Orangeburg County more aware of the need for proper and safe disposal of hazardous wastes. This type program along with proper management can help take the hazard out of hazardous wastes.

What's Next! Will "Cleansweep Orangeburg" be a one-time effort? We hope not and are already looking for ways to institutionalize the program. Many other counties have contacted our office for information and suggestions to plan hazardous waste educational programs for their clientele.

We have a number of concerns which must be addressed in order to continue our program, the first of which is funding. It cost a great deal of money to fund a collection program such as "Cleansweep Orangeburg". We must have support from state and local governments, community groups, service organizations and local industries.

Liability issues and concerns are complex and we need the support and guidance from DHEC and other regulatory agencies to educate us on how these issues can be addressed.

The development of educational materials and programs on the issues and concerns of hazardous wastes is already ten years to late. South Carolina's educational institutions, namely Clemson University, should development and publicize a variety of educational and training material appropriate for the general public.

Hazardous wastes issues has become a concern for many residents of South Carolina. Let's not miss this "teachable moment".

One-Day Collection Events: San Diego City/County

by Joy Williams

The San Diego program is an example of a county-administered program consisting of a series of one-day collection events, supplemented by two permanent sites and a door-to-door pickup service for disabled and elderly residents.

Background

San Diego County is a large county that contains 18 cities, numerous smaller communities, and large areas of agriculture and undeveloped land. The Collection program was started as a pilot program by Environmental Health Coalition (EHC) in 1984. EHC determined that there was sufficient waste to warrant an on-going program and that people were willing to drive to a collection site but were unwilling to pay a fee to use a collection service. The CIty and County of San Diego adopted the collection program in 1986 as a joint program administered by the County Hazardous Materials Management Division. EHC was contracted to provide education and outreach for the events; the waste hauler selected to handle the waste was a firm that operates a local transfer facility, which they have allowed to be used as a dropoff point for household wastes. The program is funded by the City Water Utilities Department and the County Public Works Department. Following tow paint roundups in 1986 the program started its current pattern of 12-14 collections a year a different sites around the county. For the first six months the collections were advertised as "paint-only" events, but we found that people always brought the whole range of other wastes as well. We were using 25-30 drums for the non-paint wastes that were lab-packed on site. Since then, the collections have been promoted for disposal of all household wastes except explosives, radioactives, or PCBs. Other wastes we are not accepting at this time are household batteries and fluorescent light bulbs. Early collections averaged between 100 and 200 participants. Our bigger collections now get 400-500 cars, and our surveys show that approximately 14% of participants bring wastes from more than one household.

Publicity

Methods of publicizing collections include outreach to community groups, flyer distribution in communities, press releases to all major media, with special outreach to community newsletters, and utility bill inserts. Signs posted the week prior to the collections also produce significant numbers of participants. Our surveys show that newspapers and flyers are consistently the most important means of outreach.

Pickup/Dropoff Services

As I mentioned already, the collection events are supplemented by two permanent collection sites and a pickup program which serves people who cannot drive or have very large quantities or very hazardous wastes. Our program, like most, takes in mostly paints, oil, pesticides, and cleaners. However, there isn't any type of chemical we don't see at least a small amount of, including shock-sensitive chemicals such as picric acid, water-reactives such as aluminum chloride, acids including hydrofluoric, chromic, and concentrated sulfuric, and poisons including cyanides, arsenic, and strychnine.

The Future

San Diego's collection program at present is one of the more complete collection services. As we move the program into the future, two things have become clear:

-the need to make collection services more convenient and accessible by opening more permanent sites;

- the need to balance the disposal side of the program with education for prevention.

Each collection currently costs approximately $30,000; according to one estimate it would require 50 million dollars to collect all HHW just from the City of San Diego.

These estimates raise the question: what are reasonable goals for levels of participation or amounts of waste collected? Until new funding sources are found, products are reformulated, and people begin buying fewer and less toxic products, collection events will continue to be more of a focus for education than means for keeping significant amounts of HHW out of solid and liquid waste streams. In recognition of this, our program has developed several approaches to enhanced education to ensure that collection information is always accompanied by messages on source reduction.

Refuse Collectors Program. EHC has developed a slide show, manual, and specialized presentation for refuse collectors to inform them about what's in the trash that might be hazardous, what the hazards are, and what to do when they find hazardous material in the trash. A sticker was produced for collectors to stick onto trash cans containing hazardous materials. The program is working to produce an immediate reduction in the risk to these workers and also to educate the public indirectly through the stickers.

The Schools Program. This program began in 1987 with creation of a 4th -6th grade curriculum that stresses what's toxic, reading labels, and proper disposal of HHW. A 6th-9th grade curriculum, currently in the draft stage, has a broader focus, with an emphasis on development of an environmental ethic. Both curriculums also stress alternatives to toxics.

Targeted Education. Vocational students in arts and crafts, horticulture, wood shop, and auto shop at the high school and junior college level have been targeted for specialized presentations that stress safe use and proper disposal of hazardous substances used in those areas, along with information on safer alternatives where those exist.

Safe Substitutes. Our Safe Substitutes program began two years ago. We have developed criteria for safer products, surveyed stores, developed a products list, and produced fact sheets on pest control and cleaning products. The fact sheets are given to the public at every opportunity including at collection events. Many San Diego stores stock the fact sheets or just the program brochure. A poster that highlights safer alternatives was produced last year and distributed to public places including schools, libraries, post offices, and government offices. A slide show that highlights use of the substitutes was produced last year for presentation to community groups.

In conclusion, the San Diego program provides comprehensive disposal and education programs, but we are still struggling to define goals for each of these elements and to get both the disposal and prevention messages to the public.

Maximizing Participation -- Part 1: What and Why

by

David V. Galvin
Senior Water Quality Planner
Municipality of Metropolitan Seattle (Metro)
Seattle, Washington

Household hazardous waste (HHW) programs have traditionally consisted of single-day collection events with related advertising as their public education. Programs are now moving to permanent collection sites or other types of ongoing services, and are finding inherent problems with non-event publicity for ongoing awareness and education.

Participation in a program such as HHW management can be viewed as having at least three components:

- awareness of the issue;
- behavior change, such as modifying purchasing, use or disposal practices; and
- bringing wastes to a collection site.

Each of these components need to be addressed and measured in effective, comprehensive programs.

Collection day events have traditionally attracted one to five percent participation of the households in the area being served; i.e., one to five percent bring wastes to the collection site. Awareness campaigns associated with events probably reach a larger audience, but their effectiveness is rarely measured. Public opinion surveys before and after HHW collections in the Seattle-King County area of Washington (Zehner, 1988) and in the Champaign County area of Illinois (Liebert, 1988) both found that the publicity surrounding events measurably raised the public's awareness of the HHW issue--by 26 percent in Seattle and by 20 percent in Champaign. We need more of this kind of analysis in order to document effectiveness of HHW management programs, and we need to find ways to translate increased awareness into action.

Anyone who has worked at an HHW collection comes away amazed at the volume and variety of wastes turned in. However, with the percentage of households participating in the collection usually in the single digits (and often below one percent), the drums or tons of waste collected pales by comparison to the total amount of HHW that is being stored and disposed of improperly. A few examples will illustrate.

The Seattle King County area held two of the largest collection events on record in 1988: one in June, which was a two-day event, and one in October as a single-day event. Together these events attracted 11,000 households from a metropolitan area of 617,000 households (1.4 million people), which is about two percent participation. Together, these events collected over 400 tons of HHW, which is an impressive amount to handle paint can by pesticide bottle, but which represents only six percent of the estimated amount of HHW (6,300 tons) disposed of in this area each year.

Table 1 shows a few examples of estimates of the amounts of HHW produced per year. The figures are general and the calculations "back-of-the-envelope" in quality. The result shows a range of estimates from 7.5 to 20 lbs. of HHW generated per household per year; Duxbury (1989) gives an average national figure of 15 lbs. per household. The details are not as important as the conclusion: there are between 350,000 and 900,000 tons of HHW generated in the U.S. per year.

The point I wish to make is that there is a lot of HHW out there. Even very "successful" programs by today's definitions are only getting 1-5 percent participation in collection and about the same in tonnage of wastes properly handled.

If we really want to make a significant impact on the municipal waste streams, we need to find ways to involve the other 95-99 percent of the households!

In addition, we need to address the conditionally-exempt SQG business wastes, school laboratory wastes, municipal governments' wastes and other small quantity, generally unregulated hazardous wastes that enter our municipal waste streams and the environment.

The Seattle-King County "local hazardous waste management" plan has attempted to look at this whole picture and make projections about future generation rates and what we would need to do to significantly reduce the amounts of small quantity hazardous wastes. Figure 1 shows the twenty year projections for HHW and a goal to reach 100 percent diversion in 12 years. The implications of trying to do that on our local program are shown in Table 2: a $1.8 million program in 1990 rising to $4.5 million in 1994 and $8.7 million by 2009 (without inflation). My point in showing this local example: very ambitious efforts will be needed to do more than scratch the surface for HHW management.

In conclusion, we have to **THINK BIG!!** If we are going to have a significant impact, we have to put substantial money into our programs to maximize participation, minimize waste generation over time, and maximize amounts of waste collected.

FIGURE 24.a

	San Bernardino County, CA[1]	U.S. National Estimate[2]	Albuquerque, New Mexico[3]	Santa Barbara County CA[4]	Seattle-King County, Washington[5]
Population	1,300,000	245,000,000	289,000	250,000	1,400,000
People per household	3.0	2.66	3.0	1.9	2.3
Tons of solid waste per year (in millions)		160			1.7
HHW in solid waste (%)		0.3%-0.5%	0.5%		0.33%
Tons of HHW in MSW per year		528,000-800,000	800		5,600
Additional HHW in sewer, etc.		66,000-100,000			700
Total tons of HHW per year	1,600	594,000-900,000	800	1,070	6,300
Lbs HHW per household per year	7.5	13-15	17	17	20

Table 1. A Few Estimates of HHW Generation.

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[1] From County Tanner Plan examples (Feeney, 1989).

[2] Population and household figures from 1989 Almanac (Hoffman et al., 1989); tons of MSW from EPA estimates; other calculations based on Seattle-King County methods, and Duxbury (1989).

[3] From 1983 survey, as referenced in EPA (1986).

[4] From County Tanner Plan examples (Feeney, 1989); Santa Barbara used Albuquerque survey as basis for calculations.

From Local Hazardous Waste Management Plan for Seattle-King County (1989).

FIGURE 24.b

	1990	1994	1999	2009
Education on waste reduction ($ in millions of 1989 dollars)	$0.5	$1.2	$1.0	$1.0
HHW reduction targets (in tons)	4	401	3,215	5,285
Collection of HHW ($ in millions of 1989 dollars)	$1.3	$3.3	$5.5	$7.7
HHW collection targets (in tons)	1,055	2,364	4,081	5,765

Table 2. Projections in Budgets and Tonnage for Seattle-King County's Plan to Achieve 100 Percent Diversion of HHW from Municipal Waste Streams and the Environment in a 20-year Timeframe.

References:

Duxbury, D. 1989. "A Look at HHW Management Trends." Waste Age, October, 1989, pp. 80-86.

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MAXIMIZING PARTICIPATION

Dana Duxbury
Dana Duxbury & Associates

To meet HHWM goals during the next 10-12 years, it will be necessary to implement comprehensive education and awareness programs; increase the number, frequency, and convenience of HHW collection programs; develop adequate and institutionalized funding sources; and increase participation, including the types of participants targeted by HHW programs.

During the next year, a goal should be set to build a wave of awareness in government, industry, and among the public and public interest groups. We must seek innovative ways to move out and expand the scope of awareness.

- In schools, it is not sufficient to provide curricula and bibliographies. It is necessary to ensure that curricula are utilized by obtaining top administrative support and the involvement of teachers and PTA's. Outreach should include colleges and universities as well as public and private elementary and secondary schools.
- The media must be educated so it can serve as a vehicle to spread awareness and understanding of the HHW issue.
- Real estate agents should be educated and provided with information that can be distributed to households moving to and from communities. People moving in to a community can be made aware of community HHW concerns and the availablity of HHWM. People moving away from a community can be informed by agents about how to dispose of unwanted HHW.
- Moving companies can also be educated about HHW. Movers have a vested interest in reducing the amount of HHW they transport when people move to new homes.
- Fire, police and health departments, and poison centers can be valuable resources and a voice in the community on HHWM.
- HHW program organizers need to be sure to reach out to civic and religious organizations in their communities. These groups often have a high level of concern and awareness about environmental issues and can help educate their members about HHW.

- Retail stores can be persuaded to distribute informational materials and to help identify "environmentally friendly" products to consumers. State or national "positive" or "negative" labeling laws can provide consumers with content and disposal information.

- Local task forces should be established to seek input and coordinate the efforts of government, industry and the public interest sectors.

- Industry should be encouraged to develop toxic source reduction and recycling programs, invest in R&D to produce more benign products, and to serve as product stewards by helping to ensure that their products are used, recycled, and disposed in a safe and environmentally sound manner. Industry accomplishments should receive recognition.

- Industry financial managers should be targeted since they can recognize the economic/marketing benefits that can be derived by tapping into the "green market" which exists for environmentally safer products.

- HHWM program sponsors need to broaden the realm of generators targeted by HHW programs by including conditionally exempt small quantity generators (which can include schools, farms, etc.). There is a dire need to develop awareness and provide economical hazardous waste management options for these generators.

- The frequency and convenience of HHW collections should be increased for managing the vast quantities of HHW currently stored in homes. The fact that 30 tons of DDT (a pesticide banned in the 1970s) was collected at HHW collections in Massachusetts alone illustrates the problem of stored HHW. Until we succeed at removing all of the stored HHW, as well as HHW which we cannot avoid generating (e.g., automotive oil and batteries), both source reduction and HHW collection efforts will be necessary.

- An important stumbling block in the path of comprehensive HHWM programs is money. The public must be made to understand that prevention is less expensive than remediation. We can either pay to reduce and manage HHW today, or pay much more tomorrow to correct our mistakes.

In conclusion, we should take on the responsibility to broaden the movement and the number of players involved in addressing HHW concerns. During the next year, we should strive to increase awareness; reduce HHW generation; manage the unavoidable and stored quantities of HHW; expand the realm of generators targeted by HHW programs; enlist the support of a broad range of advocates for comprehensive HHWM programs; and work together as members of government, industry, public interest groups, and the general public in tackling and solving HHW issues.

CLOSING REMARKS

Robert W. Dellinger
Acting Deputy Director
Municipal Solid Waste Program
US EPA

I thoroughly enjoyed these last 3 days and I hope my closing remarks come close to doing the conference justice.

As I mentioned on the first day of the conference, I am very new to the area of municipal solid waste. My first 17 years at EPA were devoted primarily to the areas of industrial wastewater and hazardous waste, including both hazardous waste identification and hazardous waste management. This conference was excellent in providing a tremendous amount of information to someone like myself, but also offered a lot for folks who have long been active in the area of household hazardous waste.

What I would like to do today is share a few thoughts and observations with you -- but first I'd like to tell you a little story.

There was this man who made a habit of carousing around and running to bars until all hours of the night. His wife was becoming increasingly more frustrated with him and finally decided that she had to take corrective action (see, we from EPA can always work waste management terminology into any story we tell). So one night she decided to go with him on one of his nightly binges. They end up at this favorite bar where he orders his regular drink.

She, not to be outdone, orders the same, only a double. She immediately belts down her drink, but absolutely hates it and says -- "yeck, how can anyone drink this stuff?"

To which he replies: See, and all these years you thought I was out having fun.

Well, in contrast to the two people in the story, what I have observed is that people working in the area of municipal solid waste (and household hazardous waste, as evidenced at this Conference) are having fun!

Over the last few months, I have met a lot of people -- industry representatives -- manufacturers of plastics, paper products, and packaging; people in State and local government; and citizen groups. I have also observed the efforts of EPA staff in the newly-formed Municipal Solid Waste Program.

All of these people are having fun at what they do. These are exciting times -- people sense that we are embarking on a most noble mission -- we must extend the useful life of existing landfills, but, more importantly, we all want to contribute to the safe management of the wastes we generate -- especially the hazardous and toxic materials in our waste stream. We sense a movement away from our "throw-away" society. We are on the cutting edge of what may later be described as a cultural revolution. This makes working in this area a fun and exciting thing to do.

There are some really encouraging signs that we have an excellent chance of making a difference.

Marketing and market research are not really EPA's areas of expertise, but we are aware of what recent surveys are showing:

- A 1988 survey by the National Solid Wastes Management Association found that Americans ranked garbage disposal second only to improving our educational system as the most serious problem facing local officials.
- In a recent Gallup poll, 50 percent of Americans stated they would change their purchasing habits and buy products sold in recyclable containers.
- Additionally, 90% of 1000 respondents to an an October 1988 survey felt that recycling and biodegradability would help alleviate the solid waste problem.

This change of attitude reflects an increased awareness and concern for the environment.

We in this room are uniquely situated in a position where we can take advantage of this change in attitude and use it to our advantage. We can contribute to reducing the quantity and toxicity of materials that must be disposed of. We must ensure that everyone takes the municipal solid waste crisis seriously and that they take into account environmental factors when purchasing products, buying raw materials, designing products, and in making packaging decisions. We must move toward an ethic of prevention, with a major focus on source reduction. I was extremely pleased with the number of speakers at this conference who explained that they are beginning or continuing source reduction initiatives in their localities. I was also encouraged that we were able to devote a half day to source reduction issues in the plenary session on the 1st day of the conference.

I do not want this talk to come off as a sermon or a lecture -- I'm the one that's new to this program. You folks are the experts. You are the doers, the movers and shakers -- the people that are making things happen.

I would, however, like to share with you some of what I have heard over the last few days. I'll begin by reading you the 21 pages of notes I have taken over the last 2 and 1/2 days. Before everyone leaves the room, I want to assure you that I am only kidding.

- I have been extremely impressed with the wealth of knowledge that is represented at this conference. If you are beginning a new program, don't reinvest the wheel -- learn from your peers, take advantage of the contacts you've made at this conference.

- Those of you with more mature programs, keep exchanging ideas -- refine your programs. They can only get better.

- Household hazardous waste management is a grass roots efforts -- there are no significant Federal monies immediately available. But, there may be hope in the future. RCRA reauthorization may lead to the generation of funds for waste management planning and for grants to assist in actual management efforts. Make a pitch for your fair share of these monies.

- Continue your efforts to raise the consciousness level and increase citizen participation in your programs. Many people are reporting higher participation rates in recycling programs than originally anticipated. People generally want to do the right thing. Take advantage of this situation.

- Work to put certainty into your programs. We've been told by several speakers that building stability is likely to pay huge dividends in the long run.

- Work to instill an ethic of responsibility for the wastes that we generate. Educate people when you have the opportunity to do so. Set a good example; a lot can be accomplished teaching people about the consequences of their actions.

- Leverage your resources; speakers have shared their experience that you will find that you don't have to do everything yourself. Seek assistance by involving others in the community. You are likely to save time and improve the quality of your outreach efforts, and, therefore, the success of your programs.

- Lastly, have fun, keep a stiff upper lip when things are going bad, and keep working at what you are doing. You each can make a difference and I commend your efforts.

In closing, I'd again like to thank Dana Duxbury and Kay Hickman for their very special efforts in making this conference a success. I would also like to thank all of the speakers and participants at the conference for making this a very meaningful 3 days.

I'll close by thanking you all very much for providing the opportunity to join you here in Orlando, and I look forward to seeing you at the 5th Household Hazardous Waste Management Conference.

Thank you again for being here and have a safe trip home.

Appendix I

Final Program

U.S. ENVIRONMENTAL PROTECTION AGENCY

HOUSEHOLD HAZARDOUS WASTE MANAGEMENT CONFERENCE

NOVEMBER 6-8, 1989 ORLANDO, FLORIDA

FINAL AGENDA

SATURDAY, NOVEMBER 4, 1989

2:00 p.m. - 3:30 p.m. Amnesty Days Tour *(Bus departs in front of Tower Building)*

SUNDAY, NOVEMBER 5, 1989

2:00 p.m. - 3:30 p.m. Amnesty Days Tour *(Bus departs in front of Tower Building)*
3:00 p.m. - 5:00 p.m. Registration *(Foyer Grand Hall A-D)*
7:00 p.m. - 8:30 p.m. Informal Get-together *(Grand Hall E)*

MONDAY, NOVEMBER 6, 1989

7:00 a.m. - 8:30 a.m. Registration *(Foyer Grand Hall A-D)*

8:30 a.m. - 5:30 p.m. **DISPLAY ROOM** *(Tower Building - Casa Brava)*
- Educational, Publicity and Audio-Visual Materials

8:30 a.m. - 10:00 a.m. Plenary Session *(Grand Hall)*
- Moderator: Robert Dellinger
- **Opening Remarks:** Jack Maynard, Florida DER
- **Keynote Address:** Jeffery Denit, U.S. EPA, DC
- **Federal Legislative Update:** Gerry Dorian, U.S. Congress Committee Staff, DC

10:00 a.m. - 10:30 a.m. BREAK

10:30 a.m. - 12 noon Plenary Session *(Grand Hall)*
- **HHW 1981-1989:** Dana Duxbury, DD&A, MA
- **Why HHWM is Needed:** David Galvin, Seattle Metro, WA
- **News From Rubbish Sorts:** William Rathje, University of Arizona, AZ

12 noon - 1:00 p.m. LUNCH *(Grand Hall E)*

1:00 p.m. - 1:30 p.m. **Demonstration of Live Compatibles:** Larry Sweetser, NORCAL, CA *(Beyond Swimming Pool)*

1:30 p.m. - 3:00 p.m. Plenary Session *(Grand Hall)*
- Moderator: Dana Duxbury
- **Integrating HHWM with Solid Waste Management:**
  - Dana Duxbury, DD&A
  - Ned Brooks, MPCA, MN
- **Developing a Comprehensive HHWM Program:** David Galvin, Seattle Metro, WA
- **Source Reduction**
  - **Overview:** Michael Flynn, U.S. EPA, DC

3:00 p.m. - 3:30 p.m. BREAK

3:30 p.m. - 5:30 p.m. Plenary Session *(Grand Hall)*
- **Source Reduction (continued)**
  - **S/R as Component of Integrated Waste Management:** Martha Burke, City of Seattle, WA
  - **Survey of Commercial Substitutes:** Philip Dickey, WA Toxics Coalition, WA
  - **Reformulation**
    - The Process: Carl Richie, Dow Chemical, MI
    - William Chase, CSMA, DC
  - **Developing a State-Mandated Planning Process:** Bill Green, Dept. of Ecology, WA
  - **California Waste Management Board's Program:** Caren Trgovcich, CWMB, CA

5:30 p.m. - 6:30 p.m. RECEPTION. Cash Bar *(Grand Hall E)*

TUESDAY, NOVEMBER 7, 1989

8:00 a.m. - 8:30 a.m. Registration *(Foyer Grand Hall A-D)*
8:30 a.m. - 10:00 a.m. Concurrent Sessions

I. **A. HOW-TO/PLANNING** *(Grand Hall A)*
Moderator: Joan Dotson
Planning (Coalition Support, Evaluation, Siting, etc.): Leslie Lewis, DEP, CT
Facility/Site Operations: Michael Borden, Safety Specialists, CA
Health & Safety: Larry Sweetser, NORCAL, CA
Training: Robert Ceru, Ingham County, MI

I. **B. USED OIL** *(Grand Hall B)*
Moderator: Dana Duxbury
Overview: Sarah Carney, OSW, U.S. EPA
Technical Aspects
- Re-refining: George Booth, Association of Petroleum Re-refiners, NY
- Reclaiming: Alan Gressel, Research Oil Co., OH

State Programs: Carole Bell, DEM, RI
Education: Janet Graham, Project ROSE, AL

I. **C. PESTICIDES** *(Grand Hall C)*
Moderator: Gina Purin
U.S. EPA's Activities: Tracy Bone, U.S. EPA
Collection Programs: Charles Cubbage, Dept. of Agriculture, MI
Biological Controls: Philip Dickey, WA Toxics Coalition, WA

I. **D. DISPLAY ROOM** *(Tower Building - Casa Brava)*
Educational, Publicity and Audio-Visual Materials

10:00 a.m. - 11:30 a.m. Amnesty Days Tour *(Bus departs in front of Tower Building)*

10:00 a.m. - 10:30 a.m. BREAK

10:30 a.m. - 12 noon Concurrent Sessions

II. **A. HOW-TO/WASTE MANAGEMENT** *(Grand Hall A)*
Moderator: Jan Kleman
Overview: Judy Orttung, San Bernardino County, CA
Regulatory Issues (land-bans, etc.): Leigh Starlin, CECOS, TX
Problem/Priority Wastes: Elizabeth McCormick, GSX, SC
Characterization/Standardization: Judy Orttung, San Bernardino County, CA

II. **B. PAINT** *(Grand Hall B)*
Moderator: David Kleckner
Overview of Management Options: Linda Pratt, San Diego, CA
Community Recycling: Chris Luboff, City of Seattle, WA
Industry Recycling: Curt Bailey, Jarvie Paint Company WA
Vermont's Drop & Swap Day: Michael Bender, Central Vermont RPC, VT
Dakota County's Paint Can Crusher: George Kinney, Dakota County, MN

II. **C. EDUCATION** *(Grand Hall C)*
Moderator: Michael Frishman
Overview: Cynthia Fridgen, MSU, MI
Tools: Leslie Lewis, DEP, CT
Specific Examples:
  Non-Collection: Sondra Goodman, HHWP, MO
  Industry: Tonie Santos, Chemical Waste Management, CA

II. **D. LANDFILLS & HHW** *(Grand Hall D)*
Moderator: Kean Jalowy
Landfill Excavations: Douglas Wilson, University of Arizona, AZ
Landfill Degredation: James Noble, CEM, Tufts University, MA
Landfill Contaminants and Their Detection: John Koutsandreas, U.S. EPA, DC

II. **E. DISPLAY ROOM** *(Tower Building - Casa Brava)*
Educational, Publicity and Audio-Visual Materials

12 noon - 1:30 p.m. LUNCH
Luncheon Speaker: Robert Snyder, FL DER

2:00 p.m. - 3:30 p.m. Amnesty Days Tour *(Bus departs in front of Tower Building)*

1:30 p.m. - 3:00 p.m. Concurrent Sessions

III. **A. HOW-TO/LIABILITY** *(Grand Hall A)*
Moderator: Ned Brooks
Funding/Costs: Gina Purin, NORCAL, CA
Liability: James Dougherty, U.S. EPA, DC
RFP's and Contracts: LeeAnn Merashoff, North East Solvents, MA

III. **B. HEAVY METALS (Batteries, Fluorescent Tubes)** *(Grand Hall B)*
Moderator: Kathy Margolis
Overview: David Kleckner, DD&A, MA
Lead, Cadmium, Mercury in MSW Stream: Douglas Wilson, University of Arizona, AZ
Lead Acid Batteries: Don Wojton, East Penn Manufacturing, PA

II. **C. EDUCATION** *(Grand Hall C)*
Moderator: Cynthia Fridgen
Materials: Literature/Videos/Community Education: Joan Dotson, LWV, CA
Media: Uses, Access and Education of Media: Martha Murphy, Coulter & Associates, SC
Coalition Building: Leslie Lewis, DEP, CT
Educational Curricula: Community vs. Classroom: Joy Williams, EHC, San Diego, CA

III. **D. DISPLAY ROOM** *(Tower Building - Casa Brava)*
Educational, Publicity and Audio-Visual Materials

3:00 p.m. - 3:30 p.m. BREAK

3:30 p.m. - 5:00 p.m. Concurrent Sessions

IV. **A. HOW-TO/PERMITTING** *(Grand Hall A)*
Moderator: Judy Orttung
Overview: Dana Duxbury, DD&A, MA
New York: Sharon Rehder, DEC, NY
Massachusetts: Nancy Wrenn, DEP, MA
California: Judi Frantz, DHS, CA

IV. **B. HEAVY METALS (continued)** *(Grand Hall B)*
Moderator: Leslie Lewis
Minnesota's Household Battery Study: Nancy Misra, MPCA, MN
Collection Programs: Marie Steinwachs, HHWP, MO
Recycling Lead Acid Batteries: Don Wojton, East Penn Manufacturing, PA
Recycling Dry Cell Batteries: David Cohen, Mercury Refining, NY

IV. **C. PERMANENT PROGRAM CASE STUDIES** *(Grand Hall C)*
Moderator: Jeane White
King County, WA: Henry Draper, King County, WA
Ingham County, MI: Robert Ceru, Ingham County, MI
Florida's Local Grant Programs: Jan Kleman, DER, FL
Canada's Permanent Programs: Claudia Marsales, TRICIL, Canada
San Francisco, CA: Cedar Kehoe, Sanitary Fill Company, CA

IV. **D. DISPLAY ROOM** *(Tower Building - Casa Brava)*
Educational, Publicity and Audio-Visual Materials

5:30 p.m. - 6:30 p.m. CASH BAR. *(Grand Hall E)*

WEDNESDAY, NOVEMBER 8, 1989

8:00 a.m. - 8:30 a.m. Registration *(Foyer Grand Hall A-D)*
8:30 a.m. - 10:00 a.m. Concurrent Sessions

I. **A. PERMANENT PROGRAM OVERVIEW** *(Grand Hall A)*
Moderator: Bob Ceru
Overview of U.S. Programs: Dana Duxbury, DD&A, MA
Standards for Permanent Facilities: Ned Brooks, MPCA, MN
San Bernardino, CA: Judy Orttung, San Bernardino County, CA
Minnesota Programs: Nancy Misra, MPCA, MN

I. **B. ONE-DAY COLLECTION CASE STUDIES** *(Grand Hall B)*
Moderator: Sondra Goodman
Raleigh, NC: Cindy Kling, City of Raleigh, NC
Seattle, WA: Richard Conlin, YMCA, WA
Florida Amnesty Days: Jeane White, DER, FL

I. **C. HHW WITH CONDITIONALLY EXEMPT GENERATORS** *(Grand Hall C)*
Moderator: David Kleckner
RCRA Issues: Kathy Margolis, U.S. EPA, DC
Farms: Charles Cubbage, Department of Agriculture, MI
Conditionally Exempt and Schools: Kean Jalowy, DER, FL

I. **D. ONE-DAY COLLECTION CASE STUDIES** *(Grand Hall D)*
Moderator: Judy Medler
Monroe County, NY: Alice Young, Monroe County, NY
Industry Sponsored Programs: Joseph Lindsly, Dow Chemical, MI
Orangeburg, SC: Jesse Eargle, Orangeburg County Extension, SC
San Diego, CA: Joy Williams, EHC, San Diego, CA

10:00 a.m. - 11:30 a.m. Amnesty Days Tour *(Bus departs in front of Tower Building)*

10:00 a.m. - 10:30 a.m. BREAK

10:30 a.m. - 12 noon Plenary Session *(Grand Hall A-D)*
Moderator: Robert Dellinger
Maximizing Participation: David Galvin, Seattle Metro, WA
Dana Duxbury, DD&A, MA
Closing Remarks: Robert Dellinger, U.S. EPA, DC

12 noon - 1:00 p.m. LUNCH *(Grand Hall E)*

2:00 p.m. - 3:30 p.m. Amnesty Days Tour *(Bus departs in front of Tower Building)*

Appendix II

Final List of Speakers

HOUSEHOLD HAZARDOUS WASTE MANAGEMENT CONFERENCE
ORLANDO, FLORIDA -- NOVEMBER 6-8, 1989

LIST OF SPEAKERS

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Appendix III

Speakers' Biographical Sketches

U.S. EPA: HOUSEHOLD HAZARDOUS WASTE MANAGEMENT CONFERENCE

November 6-8, 1989 -- ORLANDO, FLORIDA

The Speakers: Brief Biographies

Curt Bailey, Jarvie Paint Co., Puget Sound Paint and Coatings Association President.

Carole O. Bell, Rhode Island Dept. of Environmental Management Senior Environmental Planner, is also Director of the State Commercial Recycling Program; Coordinator of HHW Days; coordinator of the Dept.'s sections of the state solid waste plan, source reduction program, chlorofluorocarbon regulations, and currently responsible for planning and implementation of five permanent HHW facilities. She is former director of Ocean State Cleanup and Recycling Program (OSCAR) and author of OSCAR environmental educational curricula.

Michael Bender, Central Vermont Regional Planning Commission planner.

George Booth III, President of Booth Oil Co., Inc., is also President and Executive Director of the Association of Petroleum Re-refiners (APR). He has a BA in economics from Cornell University and has been involved in all areas of the re-refining of oil for reuse as a lubricant for more than 18 years.

Michael L. Borden, Safety Specialists, Inc., President and CEO, is involved in all aspects of the operation of this CA environmental, health, and safety corporation. The company is involved in a full range of hazardous and toxic material management, disposal, emergency, and educational activities, has run over 100 HHW events.

Ned T. Brooks, Minnesota Pollution Control Agency, HW Division, in St. Paul, has been working on HHW for the past 3 years, recent programs include telephone hotlines and waste exchanges. His has worked with environmental issues in private industry, with trade associations and for government.

Martha Burke, City of Seattle Office for Long-range Planning, Senior Environmental Planner, is lead planner responsible for hazardous waste (HW) and hazardous materials planning, has development management procedures for reduction and disposal of HW and studied use and location of HW in Seattle. She has an MPA in environmental management from the University of Washington.

Sarah Carney, U.S. EPA Municipal Solid Waste Program (MSWP) Environmental Protection Specialist, works on the public outreach team with special emphasis on used oil. She has a BS in natural resources from the University of Michigan.

Robert J. Ceru, Ingham County (MI) Health Dept. Bureau of Environmental Health Chief of Special Programs, oversees the county's solid waste, hazardous waste, groundwater, and toxic material programs; chemical emergency preparedness; pollution incident prevention plan; HHW collection, and indoor air programs. Michigan State University MS in Fisheries and Wildlife in limnology, BS in environmental education and fishery biology; graduate study in environmental toxicology. He served as a Peace Corps volunteer with Philippine Bureau of Fisheries and Aquatic resources.

William L. Chase Jr., Chevron Chemical Co. Consumer Products Division Manager of Registration and Regulatory Affairs, is responsible for Federal and state registration of pesticides, state registration of fertilizers; he assists regulators and legislators in educating about those areas as well as about plastic packaging. He serves on numerous California HHWM, fertilizer, and solid waste advisory boards and committees. His San Jose State College degree is in entomology.

David Cohen is vice president of Mercury Refining Co., Inc. (MERCO), Latham, NY.

Richard Conlin, Project Director Metrocenter YMCA, Seattle, WA, Director of Urban Systems Projects manages education and publicity for the King County HHWastemobile; consults for and works with City Light Study Group (utility rate watchdog), Puget Sound Water Quality Authority, Seattle Water Supply Plan Development Committee, and the Puget Sound Alliance. He has managed five HHW collections 1987-89. His MA is in political science/public administration from Michigan State University, he taught for a year at the University of Botswana and Swaziland, and he was a elected county commissioner in Ingham County, Michigan.

Dr. Charles Cubbage, Michigan Dept. of Agriculture Director Pesticide & Plant Pest Management Division, works with pesticide collection programs and has extensive experience with groundwater protection including development of educational curricula. His doctorate is in water quality and he has developed an inexpensive soil vacuuming technique for removal of volatile solvents.

Robert Dellinger, U.S. EPA Solid Waste Division Deputy Director.

Jeffery D. Denit, U.S. EPA Office of Solid Waste Deputy Director, has been at EPA since 1970 and has worked in both technical and management capacities in a wide range of environmental programs. He has MS and BS from Clemson University in agricultural economics and engineering and an MS from the University of North Carolina in sanitary engineering.

Dr. Philip Dickey, (Seattle) Washington Toxics Coalition, Household Toxics Project Director, has coordinated "Home Safe Home," an HHW public education program and has both produced published material and is working on a database on safe substitute products with their health and environmental safety ratings. He is a PhD in physics.

Gerry Dorian, Legislative Director, U.S. House of Representatives Subcommittee on Transportation and Hazardous Materials, was previously with the U.S. EPA Office of Reasearch and Development. Earlier she was responsible for Office of Solid Waste development of management strategy for incinerator ash and Revised Subtitle D Criteria.

Joan Dotson, California League of Women Voters Hazardous Waste Specialist, has long experience on the City of Redlands Planning Commission, also various solid and hazardous waste planning and advisory commissions.

Jim Dougherty, U.S. EPA Office of Enforcement, Chief of Cost-Recovery and Special Litigation Branch, is an attorney overseeing Superfund enforcement litigation including Love Canal and Times Beach cases, editor of "Environmental Law Reporter."

Henry L. Draper Jr., King County (WA) Solid Waste Division Program Coordinator, has been with the Division for four years and lead the HHW projects -- including HHW Roundups and the "Wastemobile" -- for two years. He has a BS from the University of Wyoming and an MBA from the University of Washington.

Dana Duxbury, founder of Dana Duxbury & Associates, Andover, MA, is an environmental consultant. She specializes in providing policy and educational services in solid and HW management issues to government, industry, and public interest groups. As a Senior Environmental Research Analyst at the Center for Environmental Management, Tufts University, she was active in the area of waste reduction as well as HHW. She worked for 15 years as a volunteer with the Massachusetts and U.S. League of Women voters as a solid and HW specialist and holds a BS in biology from Cornell University.

Jesse C. Eargle, Orangeburg County (SC) Extension Director of the Clemson University Extension Service, his MS and BS are both in animal science. He is involved in agricultural, water quality, HW management programs.

Michael Flynn, U.S. EPA Office of Solid Waste Acting Chief of the Criteria and Assessment Group, Municipal Solid Waste Program, with responsibility for work pertaining to municipal solid waste source reduction, land disposal, and residuals from municipal solid waste combustion. He has managed EPA's HHW activities since 1985. He has an MSPH from the University of North Carolina, his BS is from the University of Delaware.

Judi Frantz, California Department of Health Services.

Cynthia C. Fridgen, Michigan State University Assistant Professor Department of Resource Development, Solid and Hazardous Waste Management Education, responsible for developing education packages for professional staff implementation of HHW training and development activities. Earlier experience includes similar projects in energy conservation, alternative energy systems, and with sustainable agriculture and integrated farming systems. Her degrees are in environmental planning, management and education and community economic development.

David Galvin, Seattle Metro Water Pollution Control Dept. Senior Quality Planner since 1979, has conducted research projects to study source and potential control of toxic and hazardous chemicals in Puget Sound. His has done pioneering studies of toxicants in consumer products and their safe disposal. He majored in biology and environmental studies at Colby College, Waterville, ME, and spent a year working in Europe studying biological indicators of pollution.

Sondra Goodman, Missouri HHW Project Director, provides education and information training and materials to southwest Missouri, will go statewide by 1992. She has worked in sustainable agriculture research and has graduate (University of Nebraska) and undergraduate (University of Missouri) degrees in agronomy.

Janet H. Graham, Project ROSE Coordinator (at the University of Alabama) for past five years and Director of the Alabama Waste Exchange, is involved in all aspects of used oil management. She has an M.Ed. from the University of Mississippi.

William P. Green, Washington State Dept. of Ecology Environmental Planner, oversees development of 19 local HHWM plans, is developing statewide and coordinating inter-state policy for HHW and SQG's. He worked in the private sector as a chemist responsible for product development and regulatory affairs and has his MS (University of Washington) and BS (Brigham Young University) in chemistry.

Alan Gressell, President, Research Oil Co., Cleveland, OH, has been at Research Oil since 1951, BS in mathematics from John Carroll University.

Kean Jalowy, Florida Dept. of Environmental Regulation Environmental Specialist, helps coordinate and provides technical assistance at Florida HHW collections. He has a Texas A & M degree in chemical engineering and has extensive knowledge of and experience with hazardous materials.

Cedar Kehoe, Sanitary Fill Co., San Francisco HHW Collection Facility Manager, is responsible for all aspects of operating, managing, and assuring compliance at the facility. Her BA and MS are from University of Hawaii in zoology and she has hazardous waste management certification from the University of CA, Davis.

George Kinney, Dakota County (MN) Public Health Department Environmental Health Supervisor in Hazardous Waste Management, deals with licensing and inspection of hazardous waste generators, directs the county HHW program, and reviews solid waste disposal applications. He has an MS in environmental chemistry from University of Wisconsin - Green Bay.

David Kleckner, Dana Duxbury & Associates, Andover, MA, manages projects, conducts research, writes, speaks and provides technical assistance on HHW and solid waste issues. He has a Tufts University MA in urban and environmental policy.

Jan Kleman, Florida Dept. of Environmental Regulation Environmental Specialist, is program administrator of Florida's HHW Collection Center Grant Program. She also assists local governments in HHW program planning, operation, publicity, and development of ordinances to comply with Florida's legislated mandates. She is a former high school science teacher.

Cindy Kling, City of Raleigh (NC) Dept. of Public Utilities Management Analyst, is responsible for the city's public utilities budget and water and sewer rates; was project manager of Raleigh's HHW collection day, the first community sponsored event of its kind in the state, and has worked on a lead in drinking water project. She earned her MPA at the University of North Carolina at Chapel Hill, her BA at Vanderbilt.

John D. Koutsandreas, U.S. EPA Office of Modeling and Monitoring staff and Florida State University Cooperative Research Associate for Technology Transfer, conducts research on monitoring methods for municipal solid waste facilities in wet environments, has wide experience and is widely published in waste management and monitoring; was involved in NASA Gemini and Apollo Lunar programs, and was associated with the Naval Research and Naval Ordnance laboratories. He has an MS in geography from Catholic University, his BS in physics is from American University.

Leslie Lewis, CT Dept. of Environmental Protection Citizen's Participation Coordinator, works with public information and education programs, has worked in Connecticut solid waste management since 1978. She is a graduate of University of Vermont.

Joe Lindsly, Dow Chemical Issue Manager responsible for development and implementation of a multi-media waste reduction program for Dow Chemical U.S.A. He has a BA in mechanical engineering (Louisiana State University) and since joining Dow in 1979 has had technical and supervisory assignments working with chlorine/caustic, brine mining/hydrocarbon storage, and benzene.

Chris Luboff, Seattle Solid Waste Utility Environmental Analyst, is a member of Utility's program development team and project manager for HHW collection and education programs; former director of the Washington Toxics Coalition, earned her BA in zoology at the University of Washington.

Kathy Margolis, U.S. EPA Office of Solid Waste Environmental Protection Specialist, handles Municipal Solid Waste Program HHW grant coordination, implementation of the Shore Protection Act of 1988, OSW Indian coordination, and RCRA reauthorization issues. She has a BA in public policy from Duke University.

Claudia Marsales, Tricil Environmental Management (Ontario, Can.), Special Projects Sales Representative, has coordinated more than 20 permanent and special HHW collection programs and is involved locally and regionally in environmental issues.

Elizabeth McCormick, GSX Chemical Services HHW Manager, began work in HW management in 1979; GSX, with nine facilities in 7 states has conducted over 200 HHW collections. She has a BS in distributive science from American University, is active with the Chemical Waste Transportation Council and is a member of the National Solid Waste Management Association Board of Directors.

LeeAnn Merashoff, Northeast Solvents (North Andover, MA) Manager of Field Services, manages the company's HHW program. She has worked with industrial and HW for over 6 years developing innovative management techniques, and, since 1985, has worked with over 175 communities in the northeast helping design and implement HHW collection programs. She attended VPI & SU and the University of Maryland.

Nancy Misra, Minnesota Pollution Control Agency HW Division Special Wastes Unit Supervisor, is also project manager for Superfund sites and HW enforcement. She has an MS in soil microbiology and BS in microbiology, both from the University of Minnesota.

Martha S. Murphy, President, Coulter & Assts., Columbia, SC, has more than 20 years experience in public relations and advertising in both public and private sectors. She has extensive experience with budgets, creative and production work and specializes in media buying at all levels, also helped organize the Columbia BMX Assn.

Dr. James J. Noble is Senior Engineering Research Associate at the Center for Environmental Management and Associate Professor of Chemical Engineering at Tufts University. His current research interests include SW and HW technology; he was Principal Investigator for a recent EPA Report to Congress: "Extending the Useful Life of Sanitary Landfills." He is on the editorial board of "Hazardous Waste and Hazardous Materials Journal" and on the Massachusetts SW Advisory Committee.

Judy Orttung, San Bernardino County Dept. of Environmental Health Services Supervising Environmental Health Specialist, is responsible for implementation of county HW minimization and management programs. She has published HHWM materials, has BS (University of Michigan) and MS (Stanford University) in chemistry and an MPH from Loma Linda University.

Linda Gianelli Pratt, San Diego County Dept. of Health Program Manager and water/wastewater technology instructor San Diego Community College, manages HHW program, coordinates waste minimization program, inspects hazardous waste generators. She has worked as chemist, technical advisor, and inspector for sewage and waste treatment facilities and has California State University degrees in environmental science (MS) and microbiology and chemistry (BS), also CWPCA-certified Industrial Waste Inspector.

Gina Purin, Norcal Solid Waste Systems Environmental Compliance Program Coordinator, has also been at CA Dept. of Health Services and Industrial Relations and was Director of Toxics at the Golden Empire Health Planning Center. She has assisted with numerous HHW collections including the first one in CA. She has a BA from the University of CA at Davis and is co-author of materials on consumer exposure to toxics.

Dr. William L. Rathje, University of Arizona Dept. of Anthropology Bureau of Applied Research, "The Garbage Project."

Sharon Rehder, New York State Dept. of Environmental Conservation, Chemical Engineer, responsible for waste reduction, SQG, HHW and other programs in the Bureau of Hazardous Waste Program Development. She has a BS in chemical engineering from Rensselaer Polytechnic

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C.A. Carl Richie Jr., Dow Chemical Co. Agricultural Products Dept. Chief Product Steward, has been with Dow since 1966 and had assignments in engineering maintenance, environmental operations, and safety. He has a civil engineering degree from the University of Toledo.

Tonie Santos, Western states HHW Manager, Chemical Waste Management, Inc., has been with CWMI three years and assisted with development and implementation of HHW programs from marketing and publicity to actual coordination of operations at events. She is a member of a number of CA HHW committees and is working toward an environmental science degree at Ohlone College.

Marie Steinwachs, Southwest Missouri State University HHW project Asst. Director, develops and produces HHWP publications, outreach and presentations, and publicity. She is involved professionally and/or as a volunteer in HHWM and solid waste management issues both locally in Springfield, MO, and regionally (Midwest Waste Control Coalition, National Recycling Coalition, Ozarks Recycling Association).

Larry Sweetser, Norcal Solid Waste Systems Environmental Compliance Program Manager, develops programs to divert HW from landfills, one of which is the dedicated, full-time staffed HHW collection facility for the City and County of San Francisco in service since Jan. 21, 1988. He has an MA in environmental management from University of San Francisco.

Caren Trgovcich, CA Waste Management Board Senior Waste Management Specialist and HHW coordinator, is responsible for development and implementation of HHW grants program, public education and information program, and the technical assistance program.

Jeane C. White, Florida Dept. of Environmental Regulation Amnesty Days Program Coordinator, plans and organizes HHW collections in Florida's 67 counties; conducts planning workshops, prepares publicity, collects and maintains resource materials.

Joy Williams, Environmental Health Coalition (EHC) Program Coordinator, provides community education and outreach for the San Diego County HHW program, works with the EHC safe substitutes program. She has an MPH in Environmental Health and a BA in biology.

Douglas C. Wilson, Garbage Project, University of Arizona, Senior Research Associate, directs all HHW in refuse composition studies and landfill excavations.

Don Wojton, East Penn Manufacturing Co., Vice President - Manufacturing Services, is responsible for plant engineering functions and also is active with environmental, industrial health and governmental relations committees of Battery Council International. He has a mechanical engineering degree from University of Toledo.

Nancy Wrenn, Massachusetts Dept. of Environmental Protection Hazardous Waste Management Program Regional Planner, developed MA regulations for permanent HHW collection centers. She has a BA from Tufts University and attended an environmental conference in Armenia, USSR in September.

Alice J. Young, Monroe County, NY, League of Women Voters, HHW Committee Chair, volunteer in a many aspects of a broad range of HHW and SW issues. She studied theater arts at Dartmouth and anthropology and language at University of Rochester; she has been with Dartmouth Repertory Co. 10 years, a ski instructor for 20 years.

Appendix IV

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UNIV OF NE LINCOLN
TCD DEPT RM 203
LINCOLN NE 68583-0804
402-472-6319

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METRO WA COG
1875 EYE ST NW 200
WASHINGTON DC 20006
202-223-6800

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ORANGE CO FIRE DEPT
180 S WATER ST
ORANGE CA 92666
714-744-0493

JUDY ORTTUNG
SAN BERNARDINO CO DEHS
385 N ARROWHEAD AVE
SAN BERNARDINO CA 92415
714-387-4629

JOHN PEARCE
CITY OF PASADENA
100 N GARFIELD AVE
PASADENA CA 91101-72
818-405-4087

KAIA PETERSEN
DEPT OF ECOLOGY
MAIL STOP PV-11
OLYMPIA WA 98504-8711
206-438-7251

DAVID PERKINS
MAXWELL GRAPHICS
7400 IMPALA DR
RICHMOND VA 23228
804-264-3871

[illegible]
MN POLLUTION CTRL AGEN
520 LAFAYETTE RD
ST PAUL MN 55155
612-296-7039

ERNESTINE PORTER
UNIVERSITY OF IDAHO
SCHOOL OF HOME ECONOMICS
MOSCOW ID 83843
208-885-6872

LINDA PRATT
SAN DIEGO CO HLTH
P O BOX 85261
SAN DIEGO CA 92138-5261
619-338-2215

GINA PURIN
NORCAL SOLID WASTE SYS
5 THOMAS MELLON CIRCLE
SAN FRANCISCO CA 94134
415-330-1112

BARRY PULVER
ENVIRONMENTAL HLTH COALI
1844 3RD ST
SAN DIEGO CA 92116
619-235-0281

WILLIAM RATHJE
UNIV AZ DEPT ANTHROPOLGY
BLDG 30
TUCSON AZ 85721
612-621-2585

GILBERT REILING
GE LIGHTING
R5434.01 NELA PARK
CLEVELAND OH 44112
216-266-2014

MARK REISCH
CONGRESSIONAL RES SVC
LIBRARY OF CONGRESS
WASHINGTON DC 20540
202-707-7255

SHARON REHDER
NYS DEPT ENVIRON CONSERV
50 WOLF RD
ALBANY NY 12233-7253
518-457-6072

CARL RICHIE
DOW CHEMICAL USA
9008 BUILDING
MIDLAND MI 48641
517-636-2031

DENA RIZZO
NASSAU COUNTY
425 SALISBURY PARK DR
WESTBURY NY 11590
516-997-8282

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HENNEPIN COUNTY E&E
822 S 3RD ST
MINNEAPOLIS MN 55415
612-348-6570

RACHEL ROSENZWEIG
MERCER COUNTY IMP AUTH
1589 LAMBERTON RD
TRENTON NJ 08611
609-695-1200

SAM ROHLFING
SOLDI WASTE DISP DIST
1840 25TH ST
VERO BEACH FL 32960
407-567-8000

SEAN ROOK
APTUS
P O BOX 1328
COFFEYVILLE KS 67337
316-251-6380

MICHAEL ROBERTS
ADA COUNTY
650 MAIN ST
BOISE ID 83702
208-383-4422

PAUL RUNNING
PSR
PO.BOX 99369
SEATTLE WA 98199
206-285-5563

BOB RUSSELL
CHEMICAL WASTE MGMT
506 STANNAGE
ALBANY CA 94706
415-527-3803

NICHOLAS SASSIE
ORANGE CO ENV PROT DEPT
2002 E MICHIGAN STREET
ORLANDO FL 32806
407-244-7400

SELMA SAYRE
GOV'S COMM FL'S ENVIRON
2309 SR 13 SWITZERLAND
JACKSONVILLE FL 32259
904-287-1228

SHARI SAVAGE
CHEMICAL WASTE MGMT
825-M GREENBRIER CIRCLE
CHESAPEAKE VA 23320
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MINNESOTA PROJECT
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MINNEAPOLIS MN 55414
612-378-2142

SANDI SCHAFER
DISPOSAL CONTROL
1369 W 9TH ST
UPLAND CA 91786
714-983-0342

VICKI SCHLIERER
MERCURY REFINING CO INC
790 WATERVLIET-SHAKER RD
LATHAM NY 12110
518-785-1703

DAVID SCHMIDT
OAKLAND COUNTY
1200 N TELEGRAPH RD
PONTIAC MI
313-858-0880

JOHN SCHERT
ALACHUA COUNTY
1 SW 2ND PL
GAINESVILLE FL 32606
904-336-2442

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LAKELAND FL 33801
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BURLINGTON COUNTY
P O BOX 429
COLUMBUS NJ 08022
609-499-1001

DONNA SKINNER
WASTE MGMTÑCITY OF S.D.
525 B. STREET SUITE 503
SAN DIEGO CA 92101
619-533-4640

DR JOHN SKINNER
US EPA
401 M ST RD681
WASHINGTON DC 20460
202-382-2600

[illegible]
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12100 YOUNG PINE RD.
ORLANDO FL 32872
407-273-3730

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DOW CHEMICAL
PO BOX 150, BLDG 3502E
PLAQUEMINE LA 70764-0150
504-389-1630

JEFF [illegible]
SOLID WASTE
P.O. BOX 1110
TAMPA FL 33601
813-272-6674

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CHEMICAL WASTE MGMT
1090 NORTHCHASE PKWY 290
MARIETTA GA 30067
404-951-6700

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14100 CIVIC PARK DR
RIVERVIEW MI 48192
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SAVAGE MD 20763
215-935-7338

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CHEMICAL WASTE MGMT
6551 STAGE RD STE 1
BARTLETT TN 38134
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CITY OF SCOTTSBORO
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SCOTTSBORO AL 35768
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PARAMETRIX INC
13020 NORTHUP WAY
BELLEVUE WA 98005
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5 THOMAS MELLON CL R266
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1302 ELEVENTH ST
LIVE OAK FL 32060
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SANDRA TAYLOR
COOPERATIVE EXTENSION
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ST AUGUSTINE FL 32902
904-824-4564

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RADIAC RESEARCH CORP
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BROOKLYN NY 11211
718-963-2233

ANNE THORSON
WINONA COUNTY
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WINONA MN 55987
507-457-6460

CHARLES THOMPSON
HERNANDO COUNTY
202 E JEFFERSON ST
BROOKSVILLE FL 34601
904-754-4037

EDEN THRIWER
CHEMICAL WASTE MGMT
3003 BUTTERFIELD RD
OAK BROOK IL 60521
312-218-1676

[illegible]
METRO SERVICE DIST
2000 SW FIRST AVE
PORTLAND OR 97201
503-221-1646

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OLYMPIA WA 98504
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NEW YORK ST ASSEMBLY
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BUFFALO NY 14203
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CAREN TRGOVCICH
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P O BOX 3911
TALLAHASSEE FL 32315
904-562-0492

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KS DEPT OF HLTH & ENVIRO
FORBES FIELD, BLDG 730
TOPEKA KS 66620
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OLMSTED CO PUB WKS DEPT
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ROCHESTER MN 55904
507-285-8231

FRANK WENTZEL
HERNANDO COUNTY
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BROOKSVILLE FL 34601
904-754-4037

JEFF WEST
KITSAP COUNTY SAN LNDL
P O BOX 438
BREMERTON WA 98310
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ENVIRONMENTAL PACIFIC
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LAKE OSWEGO OR 97035
503-226-7331

JEANE WHITE
FL DEP
2600 BLAIR STONE RD
TALLAHASSEE FL 32399-240
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UNIVERSITY OF ARIZONA
TUCSON AZ 14618
602-621-6299

FRANK WILSON
POLK CO. ENV. SERVICES
P.O. BOX 39
BARTOW FL 33830
813-533-1389

DENNIS WILSER
ARLINGTON CO WATER POLL
3401 SOUTH GLEBE RD.
ARLINGTON VA 22202-2398
703-358-6831

HAL WILLIAMS
CHEMPRO INC
2203 AIRPORT WAY S
SEATTLE WA 98134
206-223-0500

JOY WILLIAMS
ENVIRONMENTAL GLTH COAI
1844 3RD ST
SAN DIEGO CA 92116
619-235-0281

ROSS WILLIAMS
LA DEPT OF ENV QUALITY
11720 AIRLINE HIGHWAY
BATON ROUGE LA 70817
504-295-8900

[illegible]
SNOHOMISH CO SOLID WASTE
3001 ROCKEFELLER
EVERETT WA 98201
206-259-9425

[illegible]
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8100 2ND AVENUE SO
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TODD YERKES
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SEATTLE WA 98104
206-296-4783

VALERIE YERKES
SEATTLE KING CO HLTH
120 20TH AVE
SEATTLE WA 98122
206-296-4633

ALICE YOUNG
LEAGUE OF WOMEN VOTERS
540 CLOVER HILLS DR
ROCHESTER NY 14618
716-244-5824

AUDREY YOUNG
153 KELLY LANE
VALPARAISO FL 32580

LAWRENCE ZAAYENGA
MONMOUTH CO PLANNING BD
HALL REC ANNX, E MAIN ST
FREEHOLD NJ 07728
201-431-7460

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OLYMPIA WA 98504-8711
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Appendix V

The National Listing of Household Hazardous Waste Collection Programs: 1988-1989

THE NATIONAL LISTING OF HOUSEHOLD HAZARDOUS WASTE COLLECTION PROGRAMS*
1988-1989

The information in this on-going database about household hazardous waste (HHW) collection programs has been collected and assembled by Dana Duxbury & Associates (DD&A) to provide basic information on HHW collection programs nationwide (including farm and conditionally exempt generator waste), and to serve as a resource for identifying program contacts. This listing includes all 1988 and 1989 programs that could be identified by DD&A. Collection program data from 1980-1987 can be ordered from DD&A.

Programs are listed by state in chronological order. Specialty programs are identified with a particular symbol (see key below). They include "paint only," "farm pesticides only," "dry cell batteries only", or oil collected at the curbside. We also specified whether a program was a permanent collection. A permanent program is defined by DD&A as a program with at least monthly collections held at a fixed site or at a dedicated mobile facility. Permanent programs appear in the data base only once in each year of operation. Programs with a common sponsor and in the same community or local area are listed as a single event, even if held at multiple sites or on two or more consecutive days.

Information on costs, amount of waste collected, and number of participants is presented in the units provided by our sources. Although a single program sponsor is listed for each program, some programs have multiple sponsors. DD&A recommends contacting the sponsor for more comprehensive information about individual programs.

As no central directory or national reporting requirement exists, DD&A used various project sponsor materials, state and municipal information, personal contacts, reporting forms, and other information sources to obtain as complete and accurate data as possible. We would appreciate your assistance in keeping the listings current as well as in correcting any inaccuracies. **Please supply us with any additions or corrections** by filling out the accompanying survey (Part A) form. Send it to Dana Duxbury & Associates, 16 Haverhill Street, Andover, MA 01810. (508) 470-3044. **Please use this form to send us information on all 1990 programs as well.**

Specialty Program Key

^ = paint only
# = farm pesticide only
@ = oil collection only
> = mobile permanent collection program
B = household battery collection only
C = part of curbside recycling program
R! = HHW recyclables only
S = school lab clean up
* = permanent programs (in effect at a fixed site at least once per month)
$ = also accepts Conditionally exempt Small Quantity Commercial Generator waste
() = around a number after the location, indicates number of sites participating in one collection event
(Xdy)/(dys) = X number of days in given time period for multi-day collection

*The data includes collection programs for HHW; farm and conditionally exempt Small Quantity Generator waste, and specialized programs such as: paint only, farm pesticide only, dry cell battery only, curbside or special used oil collection programs, etc.

January 1990

HOUSEHOLD HAZARDOUS WASTE COLLECTION PROGRAMS TOTALED BY YEAR

State	1980	1981	99	1983	1984	1985	1986	1987	1988	1989	Total
Alabama						1				1	2
Alaska				2	3	4	7	2	6	10	34
Arizona								1	1	2	4
Arkansas								1			1
California			1	5	12	37	28	80	98	107	368
Colorado					4	1				3	8
Conecticut					1	9	25	24	38	34	131
Delaware								1			1
Florida					21	22	16	13	18	61	151
Georgia											0
Hawaii							1	1	2	9	13
Idaho										2	2
Illinois								1	6	1	8
Indiana						2	1	2	5	4	14
Iowa							2		3	11	16
Kansas							3				3
Kentucky		2		1							3
Louisiana						1	1	1	2	2	7
Maine			1		2		1		1	2	7
Maryland						1		2	3	5	11
Massachusetts			1	14	31	33	78	51	101	91	400
Michigan					2	8	14	11	20	25	80
Minnesota						7	10	9	32	55	113
Mississippi											0
Missouri									1	1	2
Montana					1						1
Nebraska						3		1	3	3	10
Nevada											0
New Hampshire					1	4	11	20	20	19	75
New Jersey						8	7	3	13	31	62
New Mexico						1				3	4
New York			1	4	2	8	21	28	43	56	163
North Carolina						2	1	1	1	4	9
North Dakota											0
Ohio					2		1		1	1	5
Oklahoma											0
Oregon			1	1	1		2	2	3	3	13
Pennsylvania						1	1	2	5	5	14
Rhode Island					5	4	4	7	5	5	30
South Carolina									1		1
South Dakota							1				1
Tennessee							1				1
Texas							6	2	5	2	15
Utah							2				2
Vermont					1	2	5	3	2	5	18
Virginia						1	3	7	15	9	35
Washington	1	2	3	4	3	8	12	12	16	41	102
West Virginia						1		1			2
Wisconson					2	6	9	9	7	14	47
Wyoming										1	1
Total/Year	1	4	8	31	94	175	274	298	477	628	1990
Total States	1	2	6	7	17	25	29	30	31	36	4

SOURCE: DANA DUXBURY & ASSOC
JANUA

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01/10/90

HOUSEHOLD HAZARDOUS WASTE COLLECTION PROGRAMS BY STATE 1988-1989

STATE	LOCATION	DATE	YEAR	SPONSOR	CONTACT	CPHONE	HAULER	HPHONE	COST	WASTE	PARTICIP
Alabama	Emelle %		/89	Chem Waste Managemen	Gordon Kenna	404/951-6700	Chem Waste Managemnt	205/652-6721	0.00	school lab clean up	0
Alaska	Fairbanks (2 days)	06/02	/88	DEC and towns	Glen Miller	(907)465-2666	NW Env. Services		0.00		0
Alaska	Anchorage*	11/	/88	City	Jim Sweeney	(907)261-5223			0.00		0
Alaska	Seward (2 days)	5/12	/88	DEC and towns	Glen Miller	(907)465-2666	NW Env. Services		0.00		0
Alaska	Homer (2 days)	5/19	/88	assistd towns	Glen Miller	(907)465-2666	NW Env. Services		0.00		0
Alaska	Soldotna (2 days)	5/26	/88	DEC and town	Glen Miller	(907)465-2666	NW Env. Services		0.00		0
Alaska	Ketchikan (2 days)	6/09	/88	DEC and towns	Glen Miller	(907)465-2666	NW Env. Services		0.00		0
Alaska	Anchorage* 8		/89	AK Solid Waste Dept	Bill Krygor	907/561-1900	NW Enviro Services	907/428-1742	1000000.00		0
Alaska	Fairbanks(3days)	06/06	/89	local and state govt	Glenn Miller	907/562-3321	NW Enviro Services	907/562-3321	0.00		0
Alaska	Kodiak(3days)	05/11	/89	Kodiak Island gov't	Glenn Miller	907/562-3321	NW Enviro Services	907/562-3321	0.00		0
Alaska	Palmer(3days)	05/18	/89	Kena Peninsula Boro	Glenn Miller	907/562-3321	NW Enviro Services	907/562-3321	0.00		0
Alaska	Soldotna(4 days)	05/27	/89	Kena Peninsula Boro	Glenn Miller	907/562-3321	NW Enviro Services	907/562-3321	0.00		0
Alaska	Homer (3days)	06/01	/89	Kena Peninsula Boro	Glenn Miller	907/465-2671	NW Enviro Services	907/562-3321	0.00		0
Alaska	Seward(2 days)	06/10	/89	local and state govt	Glenn Miller	907/562-3321	NW Enviro Services	907/562-3321	0.00		0
Alaska	Juneau(3 days)	06/17	/89	local and state govt	Glenn Miller	907/562-3321	NW Enviro Services	907/562-3321	0.00		0
Alaska	Sitka (3 days)	06/24	/89	local and state govt	Glenn Miller	907/562-3321	NW Enviro Services	907/562-3321	0.00		0
Alaska	Gridwood	10/21	/89	Muni of Anchorage	Bill Kreiger	907/561-1900	NW Enviro Services	907/562-3321	0.00		0
Arizona	Tucson (2 days)	11/19	/88	City	Katherine Flagg	(602)791-5414	Disposal Control	602-268-0999	0.00		0
Arizona	Tucson/Pima County		/89		Kathryne Flagg	602/791-5414			0.00		0
Arizona	Phoenix (2 dys)	10/28	/89	City of Phoenix	Wanda Wildman	602/262-7949	Disposal Control Srv	714/981-0998	0.00		0
California	Sacramento City		/88	Fire Dept	Robert Knight	(916)366-4268			0.00		0
California	Santa Cruz		/88	City	Ilsa Kolbus	(408)425-2341			0.00		0
California	Monterey County*		/88	MontryRegionalWstMan	William Merry	(408)384-5313			0.00		0
California	Felton		/88	City	Ilsa Kolbus	(415)465-2341			0.00		0
California	Watsonville		/88	City	Ilsa Kolbus	(408)425-2341			0.00		0
California	Gardena		/88	Cnty	Daryl Carpenter	(213)532-9906	Approp Tech II	(619)421-1175	0.00		0
California	San Bernardino*		/88	San Bernardino Cnty	Judy Ortlung	(714)387-4629			0.00		0
California	Fontana*		/88	San Bernardino Cnty	Judy Ortlung	(714)387-4629			0.00		0
California	Rancho Cucamonga*		/88	San Bernardino Cnty	Diane Christensen	(714)387-4626			0.00		0
California	Redlands*		/88	San Bernardino Cnty	Joan Dotson	(714)793-1164			0.00		0
California	Victorsville*		/88	San Bernardino Cnty	Judy Ortlung	(714)387-4629			0.00		0
California	Barstow*		/88	San Bernardino Cnty	Judy Ortlung	(714)387-4629			0.00		0
California	Sunnyvale CO		/88	Ass. Bay area Govern	Emy Chan Mejoria	416/464-7941			0.00	22,000 gallons inn 1	0
California	San Diego	01/09	/88	City	David Harris	(619)236-0281	Appropriate Tech	(619)421-1175	0.00	2538 gallons	251
California	San Francisco*	01/21	/88	Cnty and City	Larry Sweetser	(415)468-2442	Sanitary Fill Co.	(415)468-2442	0.00		0
California	Carlsbad City	01/30	/88	San Diego Cnty	David Harris	(619)236-0281	Appropriate Tech	(619)421-1175	0.00	2143 gallons	297
California	Crestline	03/05	/88	San Bernardino Cnty	Diane Christensen	(714)387-4626			0.00		0
California	Santa Rosa	03/05	/88	City	Eileen Kortus	(707)576-5311	Chem Waste	(415)770-0675	23430.24		126
California	Spring Valley	03/05	/88	San Diego Cnty	David Harris	(619)236-0281	Appropriate Tech	(619)421-1175	0.00	1573 gallons	188
California	Palmer	03/19	/88	San Bernardino Cnty	Diane Christensen	(714)387-4626			0.00		0
California	San Diego	03/19	/88	City	David Harris	(619)236-0281	Appropriate Tech	(619)421-1175	0.00	2190 gallons	322
California	Yolo County	04/	/88	Cnty	Jay Holmquist	(916)666-8775			0.00		0
California	Nevada County	04/	/88	Cnty	Woody Holsey	(916)265-1411			0.00		0
California	Davis	04/	/88	Cnty	Jay Holmquist	(916)666-8775	Safety Specialists	(415)988-1111	0.00		0
California	Healdsberg	04/01	/88				Chem Waste Mgmt	(415)770-0675	0.00		0
California	Ontario	04/04	/88	San Bernardino Cnty	Diane Christensen	(714)387-4626			0.00		0
California	Encinitas	04/04	/88	San Diego County	David Harris	(619)236-0281	Appropriate Tech	(619)421-1175	0.00	2587 gallons	350
California	Upland	04/09	/88	San Bernardino Cnty	Diane Christensen	(714)387-4626			0.00		0
California	Milpitas	04/16	/88	City	Bob Webster	(408)942-2303			0.00		0
California	Los Altos	04/16	/88	City	Daffney Seigert	(415)948-1401			0.00		0
California	Healdsberg	04/16	/88	City	Robert Taylor		Chem Waste	(415)770-0675	0.00		64
California	Palo Alto	04/23	/88	City	Rosemary Ralston	(415)329-2522			0.00		0
California	San Diego	04/23	/88	City	David Harris	(619)236-0281	Appropriate Tech	(619)421-1175	0.00	2003 gallons	385
California	W. Nevada Cnty	04/25	/88	DOH, Waste Mgt Dept	Woody Holsey	(916)265-1411	American Env. Mgmt	(714)826-6320	19500.00	63 drums	560
California	Alcahone City	05/07	/88	San Diego Cnty	David Harris	(619)236-0281	Appropriate Tech	(619)421-1175	0.00	4198 gallons	485
California	Sunnyvale County	05/14	/88	Cnty	Gene Willroth	(408)730-7277			0.00		0
California	Simi Valley	05/14	/88		Brian Gabler	(805)583-6701	GSX	(803)798-2993	0.00		0
California	Santa Barbara	05/14	/88	County	Karin Feeney	(805)963-0683	American Env. Mgmt.	(714)826-6320	53450.00	160 drums,700 gal.	506
California	Davis	05/15	/88	Yolo County	Jay Homquist	(916)666-0755	Safety Specialists	(408)988-1111	0.00	36 drums	240

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HOUSEHOLD HAZARDOUS WASTE COLLECTION PROGRAMS BY STATE 1988-1989

STATE	LOCATION	DATE	YEAR	SPONSOR	CONTACT	CPHONE	HAULER	HPHONE	COST	WASTE	PARTICIP
California	Santa Rosa, 7 dy	05/16	/88	City	Eilene Kortus	(707)576-5311	Chem Waste	(415)770-0575	35120.25	303 drums	510
California	Scotts Valley	05/21	/88	City	Bob Geyer	(408)438-0732			0.00		0
California	Big Bear	05/21	/88	San Bernardino Cnty	Diane Christensen	(714)387-4026			0.00		0
California	San Diego	05/21	/88	City	David Harris	(619)235-0281	Appropriate Tech	(619)421-1175	0.00	1190 gallons	125
California	Santa Monica *	06/00	/88	City of Santa Monica	Jennifer Stone	(213)458-8228			0.00		0
California	Newark,Fremont,Union	06/04	/88	City	John Sheahan	(415)465-2011	Chem Waste	(415)770-0575	210000.00	570 lab packs	2000
California	Morgan Hill City	06/04	/88	City	Susan Kohlmansber	(408)779-7231	Env-Control	(408)846-1476	5306.06		140
California	Lompoc	06/06	/88	Santa Barbara Cnty	Karin Feeney	(805)963-0583	American Env. Mgmt.	(714)826-6320	38000.00	55 drums,1560 gal.	360
California	Union City	06/11	/88	City	John Sheahan	(415)465-2011	Chem Waste	(415)770-0575	88060.90		1000
California	San Diego	06/11	/88	City	David Harris	(619)235-0281	Appropriate Tech	(619)421-1175	0.00	1534 gallons	205
California	Irvine	06/18	/88	City	Patricia Macintosh	(714)660-3800	Chem Waste	(415)770-0575	20155.00		0
California	Sacramento	06/25	/88	Cnty	Robert Knight	(916)386-6160			0.00		0
California	San Marcos	06/25	/88	San Diego Cnty	David Harris	(619)235-0281	Appropriate Tech	(619)421-1175	0.00	4106 gallons	638
California	Salinas	07/	/88	City	Al Rossi	(408)424-0019			0.00		0
California	Palo Alto	07/	/88	City	Rosemary Ralston	(415)392-2522	Safety Specialists	(408)988-1111	0.00		0
California	Orange County	07/	/88	Cnty	Barbara Eifenman	(714)667-7313	Approp Tech II	(619)421-1175	0.00		0
California	Petaluma	07/09	/88		Toni Santos	(415)770-0575	Chem Waste Mgmt	(415)770-0575	0.00		0
California	Los Angeles County	07/09	/88	Cnty	Joe Reilly		Approp Tech II	(619)421-1175	0.00		0
California	Sonoma County	07/09	/88		Steve Marler	(707)966-2102	Chem Waste Mgmt	(415)770-0575	0.00		0
California	Cupertino	07/16	/88	City	Kathy Blackburn	(408)252-4505			0.00		0
California	Sonoma	07/16	/88	City	Al Mazza	(707)996-2102	Chem Waste	(415)770-0575	0.00		78
California	Anaheim ^	08/06	/88	Orange Cnty Haz Matl	Janis Oest	(714)774-0564	Disposal Control	(714)983-0342	0.00		0
California	San Diego	08/06	/88	City	David Harris	(619)235-0281	Appropriate Tech	(619)421-1175	0.00		125
California	Santa Rosa	08/13	/88	City	Eilene Kortus	(707)576-5311	Chem Waste	(415)770-0575	0.00		153
California	Huntington Beach	08/13	/88	Orange Cnty Haz Matl	Janis Oest	(714)744-0564	Disposal Control	(714)983-0342	0.00		0
California	Anaheim	08/20	/88	Orange Cnty Haz Matl	Janis Oest	(714)744-0564	Disposal Control	(417)983-0342	0.00		0
California	Anaheim	08/27	/88	Orange Cnty Haz Matl	Janis Oest	(714)744-0564	Disposal Control	(714)983-0342	0.00		0
California	Agoura	08/28	/88	LA Cnty Sanitation	Joe Reilly	(213)699-7411	Chem Waste Mgm't	(415)770-0575	43868.04	17(55)6(30)500galoil	175
California	Hayward	09/	/88	City	Dolores Meersman	(415)581-2345			0.00		0
California	University City	09/10	/88	San Diego City	David Harris	(619)235-0281	Appropriate Tech	(619)421-1175	0.00		315
California	Whittier	09/18	/88	LA Cnty Sanitation	Joe Reilly	(213)699-7411	Appropriate Tech	(619)421-1175	51819.12	33(55)500galMO390lbB	183
California	Stanton ^	09/24	/88	Orange Cnty Haz Matl	Janis Oest	(714)744-0564	Disposal Control	(714)983-0342	0.00		236
California	Oceanside	09/24	/88	San Diego County	David Harris	(619)235-0281	Appropriate Tech	(619)421-1175	0.00		450
California	Santa Maria	09/24	/88	Santa Barbara Cnty	Karin Feeney	(805)963-0583	Safety Specialists	(408)988-1111	44800.00		430
California	Santa Clara	10/00	/88	City	Nick Rimauro, Jr.	(408)727-5365			0.00		0
California	Mt. View	10/00	/88	City	Frank Moe	(415)966-6343			0.00		0
California	Truckee	10/01	/88	Nevada Cnty DOT	Woody Helsey	(916)265-1411	Safety Specialists	(408)988-1111	4780.00	17 drum.	0
California	Irvine	10/01	/88	Orange Cnty Haz Matl	Janis Oest	(714)744-0564	Disposal Control	(714)983-0342	0.00		540
California	Rolling Hills Est.	10/08	/88	LA Cnty Sanitation	Joe Reilly	(213)699-7411	American Env.	(714)826-6320	109947.13	123 drums, 1950galMO	530
California	W. Nevada Cnty	10/08	/88	DOT, Waste Mgmt Dept	Woody Helsey	(916)265-1411	Safety Specialists	(408)988-1111	36893.00	118 drums	497
California	Mt View, 2 others	10/08	/88	Cities	Rory Kessler	(408)299-4361	Safety Specialists	(408)988-1111	0.00		0
California	Irvine	10/08	/88	Orange County	Janice Oest	(714)744-0493			0.00		0
California	Petaluma	10/15	/88				Chem Waste	(415)770-0575	0.00		0
California	Davis	10/15	/88	Yolo County	Jay Holmquist	(916)666-8776	Safety Specialists	(408)988-1111	10000.00	40 drums	279
California	San Diego	10/16	/88	City	David Harris	(619)235-0281	Appropriate Tech	(619)421-1175	0.00		60
California	W. Sacramento	10/22	/88	Yolo County	Jay Holmquist	(916)666-8776	Chem Waste Mgmt	(312)572-8800	0.00		0
California	Petaluma	10/29	/88				Chem Waste	(415)770-0575	0.00		0
California	Lysalia	10/29	/88	Audubon Society,	Greg Sparks	(209)733-0001	Chem Waste Mgmt	(312)572-8800	0.00		0
California	Poway	10/29	/88	San Diego County	David Harris	(619)235-0281	Appropriate Tech	(619)421-1175	0.00		0
California	Santa Ynez Valley &	10/29	/88	Santa Barbara Cnty	Karin Feeney	(805)963-0583	Safety Specialists	(408)988-1111	0.00	49drm/375glol/1342pn	132
California	Southgate	10/30	/88	LA Cnty Sanitation	Joe Reilly	(213)699-7411	Chem Waste	(213)699-7411	0.00		0
California	South Gate	10/30	/88	LA County Sanitation		213/699-7411	Appropriate Tech.Inc	619/421-1175	50203.59	40(55)drums, 1175gMO	256
California	Santa Rosa	11/05	/88				Chem Waste	(415)770-0575	0.00		0
lifornia	San Diego	11/12	/88	City	David Harris	(619)235-0281	Appropriate Tech	(619)421-1175	0.00		0
ornia	Santa Barbara $	11/19	/88	County	Karin Feeney	(805)963-0583	Safety Specialists	(408)988-1111	0.00	187drm/1600ol/2240pn	765
ia	Big Bear Lake	11/19	/88	San Bernardino Cnty	Diane Christiansen	714/387-4629			4925.00	10(55)gallon Drum.	121
	Pomona	11/20	/88	LA Cnty Sanitation	Joe Reilly	(213)699-7411	Approp. Tech	(619)421-1175	0.00		0

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HOUSEHOLD HAZARDOUS WASTE COLLECTION PROGRAMS BY STATE 1988-1989

STATE	LOCATION	DATE	YEAR	SPONSOR	CONTACT	CPHONE	HAULER	HPHONE	COST	WASTE	PARTICIP
California	San Mateo	Spr.	/88	City	Dolores Lutter	(415)363-4392			0.00		0
California	San Bernardino*		/89	County	Judy Orttung	714/387-4629			475000.00	cost for 5 sites	0
California	Redlands*		/89	County	Judy Orttung	714/387-4629			0.00		0
California	Rancho Cucamonga*		/89	County	Judy Orttung	714/387-4629			0.00		0
California	Victorville*		/89	County	Judy Orttung	714/387-4629			0.00		0
California	San Francisco*		/89	City/Sanit'y Fill Co	Larry Sweetzer	415/330-1107			0.00		0
California	Santa Monica*		/89	City	Brian Johnson	213/458-8228			100041.00	annual budget	0
California	Monterey*		/89	Regional Wst Man Dis	Neil Jones	408-384-5313	Safety Specialists	408/988-1111	0.00		0
California	Barstow*		/89	County	Judy Orttung	714/387-4629			0.00		0
California	Modesto * G C		/89	City of Modesto	Jane Hinshaw	209/577-5493	Mod Dis & Gilton SW	209/538-2210	0.00	7500 gal oil year	50000
California	SE San Diego	01/20	/89	City & County of SD	Linda Pratt	619/338-2222	Appropriate Tech. II	619/421-1175	0.00		0
California	Los Angeles/Reseda	01/21	/89	City	Jim Grant	408/988-1111	Safety Specialists	408/988-1111	0.00	690 drm,5978 gl pnt	1700
California	East San Diego	02/18	/89	City/San Diego Count	Phyllis J. Chalmers	619/338-2222	Appropriate Tech II	619/421-1175	23467.80	2735 gal	270
California	Old Town	02/24	/89	City & County of SD	Linda Pratt	619/338-2222	Appropriate Tech. II	619/421-1175	0.00		0
California	Los Angeles/Westwood	02/26	/89	City	Jim Grant	408/988-1111	Safety Specialists	408/988-1111	0.00	610 drm,3600 gl pnt	1500
California	Morgan Hill	03/06	/89		Sharon Kohlmannslehn	408/779-7231			0.00		0
California	Santee	03/11	/89	City/San Diego Count	Phyllis J. Chalmers	619/338-2222	Appropriate Tech II	619/421-1175	21756.86	2232 gallons	240
California	South San Diego	03/17	/89	City & County of SD	Linda Pratt	619/338-2222	Appropriate Tech. II	619/421-1175	0.00		0
California	Grass Valley	03/17	/89	McCourtney Rd Landfl					0.00		0
California	El Cajon	04/07	/89	City & County of SD	Linda Pratt	619/338-2222	Appropriate Tech. II	619/421-1175	0.00		0
California	Santa Clara	04/08	/89	City	Bill Alexander	408/984-3080	Safety Spec.	408/988-1111	0.00	198 drm,983 gl pnt	912
California	Los Altos	04/15	/89	Los Altos	Daphne Siegert	415/948-1491			0.00		0
California	Milpitas	04/15	/89	City	Robert Webster	408/942-2386			0.00		0
California	Del Mar	04/15	/89	City/San Diego Count	Phyllis J. Chalmers	619/338-2222	Appropriate Tech II	619/421-1175	34512.96	4577 gallons	580
California	Los Angeles/Van Nuys	04/15	/89	City	Jim Grant	408/988-1111	Safety Specialists	408/988-1111	0.00	829 drm,2650 gl pnt	1500
California	Healdsburg	04/15	/89	Empire Waste Mangmnt			Chem Waste Mangmnt	415/770-0575	11800.00	23(55) gallon Drums	91
California	Mira Mesa	04/22	/89	City/San Diego Count	Phyllis J. Chalmers	619/338-2222	Appropriate Tech II	619/421-1175	31025.66	3972 gallons	466
California	Petaluma	04/22	/89	Empire Waste Mangmnt	Toni Santos	415/770-0575	Chem Waste Mangmnt	415/770-0575	17900.00	34(55) gallon Drums	76
California	Montclair	04/22	/89	City/FireDpt/EnvHlth	Judy Orttung	714/387-4629	Disposal Control	800/824-3345	0.00		0
California	Portland	04/22	/89	Metro Service Dist.	Vicky Rocker	503/221-1646	Safety Spec.	408/988-1111	0.00	975 drm,3600 gl pnt	2506
California	Santa Barbara	04/26	/89	City of Santa Barbar					0.00		0
California	Mira Mesa	04/28	/89	City & County of SD	Linda Pratt	619/338-2222	Appropriate Tech. II	619/421-1175	0.00		0
California	Palo Alto	04/29	/89	City	Rosemary Ralston	415/329-2522	Safety Spec	408/988-1111	0.00	241 drm, 1000 gl pnt	526
California	Santa Ynez 8	04/29	/89	City/Cnty Santa Barb	Jim Grant	408/988-1111	Safety Specialists	408/988-1111	22000.00	39drm/195glol 120pnt	497
California	El Segundo	04/29	/89	Fire Department	Jerry Richmond	213/322-4311	Safety Specialists	408/988-1111	0.00	22 drm, 275 gl pnt	150
California	Grass Valley	04/29	/89	Department of Trans	Jim Grant	408/988-1111	Safety Specialists	408/988-1111	3200.00	100 drm, 990 gl pnt	395
California	Vallejo	04/29	/89	city LWV	Dave Lindquist	707/648-4594	Norcal Solid Waste	707/552-3110	0.00		0
California	Santa Rosa	04/29	/89	Empire Waste Mangmnt			Chem Waste Mangmnt	415/770-0575	63500.00	216(55) gallon Drums	76
California	29 Palms	04/29	/89	FreDpt/Sunstar	Judy Orttung	714/387-4629	County of San Bernar	714/387-4629	0.00		0
California	Yucca Valley	04/29	/89	County of San Bernar	Judy Orttung	714/387-4629	County of San Bernar	714/387-4629	0.00		0
California	Hyland	04/29	/89	City of Hyland	Judy Orttung	714/387-4629	Jack's/Cal Disposal		0.00		100
California	Woodland	05/06	/89	Woodland Disposal	Toni Santos	415/770-0575	Chem Waste Mangmnt	415/770-0575	9600.00	37(55) gallon Drums	100
California	Upland	05/06	/89	City	Judy Orttung	714/387-4629	Disposal Control	800/824-3345	0.00		0
California	Sunnyvale	05/13	/89	City	Gene Willroth	408/730-7277	Safety Spec	408/988-1111	0.00	207 drm, 1200 gl pnt	643
California	Davis	05/13	/89	Recycling Center	Jim Grant	408/988-1111	Safety Specialists	408/988-1111	0.00	38 drm, 410 gl pnt	314
California	Santa Barbara 8	05/13	/89	County Santa Barbara	Karen Feeney	805/963-0583	Safety Specialists	408/988-1111	125000.00	422drm/1700ol/850pnt	1350
California	Escondido	05/19	/89	City & County of SD	Linda Pratt	619/338-2222	Appropriate Tech. II	619/421-1175	0.00		0
California	Los Angeles/S.Centl	05/20	/89	City	Fazl Mofidi	213/485-8823	Safety Spec.	408/988-1111	0.00	337 drm, 976 gl pnt	360
California	San Jose (2)	06/03	/89	San Jose	Kim Bay-Menacho	408-277-4600	Safety Specialists	408/988-1111	334087.00	883 drm,3953 gl pnt	2300
California	Morgan Hill	06/03	/89	Gilroy&SantaClaraC./	Sharon Kohlmannslehn	408/779-7231	Norcal Solid Waste	415/330-1112	0.00		0
California	Lompoc 8	06/10	/89	City/Cnty Santa Barb	Karen Feeney	805/963-0583	Safety Specialists	408/988-1111	53000.00	151drm/164lol/490pnt	482
California	West Clairemont	06/16	/89	City & County of SD	Linda Pratt	619/338-2222	Appropriate Tech. II	619/421-1175	0.00		0
California	Big Bear	06/17	/89		Judy Orttung	714/387-4629			0.00		0
California	Los Angeles/HarbrCty	06/24	/89	City	Gavin Brownlie	408/988-1111	Safety Specialists	408/988-1111	0.00	538 drm, 1500 gl pnt	1040
California	Descanso	06/30	/89	City & County of SD	Linda Pratt	619/338-2222	Appropriate Tech. II	619/421-1175	0.00		0
California	Scotts Valley	07/08	/89	City	Bob Geyer	408/438-0732	Safety Specialists	408/988-1111	0.00	70 drm, 250 gl pnt	0
California	Onena	07/09	/89	Empire Waste Mangmnt	Tonie Santos	415/770-0575	Chem Waste Mangmnt	415/770-0575	0.00	40(55) gallon Drums	76
California	Santa Clara	07/11	/89	City of Santa Clara					0.00		0
California	Cupertino	07/16	/89	Cupertino	Steve Sano	408/252-4605	Bay Area Environmntl	415/233-8001	0.00		0

HOUSEHOLD HAZARDOUS WASTE COLLECTION PROGRAMS BY STATE 1988-1989

STATE	LOCATION	DATE	YEAR	SPONSOR	CONTACT	CPHONE	HAULER	HPHONE	COST	WASTE	PARTICIP
California	Palo Alto	07/22	/89	City	Rosemary Ralston	415/329-2522	Safety Specialists	408/988-1111	44855.00	121 drm, 2133 gl pnt	463
California	Santa Rosa (2dy)	08/12	/89	City & Empire Wst Mn	Bob Mattori	707/585-0291	Chem Waste Manage.	415/770-0575	25000.00	64 drums	146
California	Los Angls/GranadaHl	08/19	/89	City	Fazi Mofidi	213/485-8823	Safety Spec.	408/988-1111	0.00	1001 drm,5270 gl pnt	2450
California	Irvine	08/19	/89	City & WMNA Dewey Rn	Tonie Santos	415/770-0575	Chem Waste Manage.	415/770-0575	35000.00	55drm,1033pnt,175oil	500
California	Truckee	08/26	/89	City	Mike Borden	408/988-1111	Safety Spec.	408/988-1111	5000.00	3 drm, 110 gl pnt	44
California	Rancho Penasquitos	09/09	/89	City & County of SD	Linda Pratt	619/338-2222	Appropriate Tech. II	619/421-1175	0.00		390
California	Union City	09/16	/89	Fire Dpt & WMNA Oakl			Chem Waste Manage.	415/770-0575	0.00	173drm,4130pnt,936ol	780
California	San Mateo	09/21	/89	SM County Health Dep	Jennifer Stone	415/363-4717	North State Environl	415/588-9652	276000.00	115drm/200ol/1500pnt	95
California	Santa Clara	09/23	/89	City	Bill Alexander	408/984-3080	Safety Specialists	408/988-1111	44000.00	127 drm, 921 gl pnt	1124
California	Hayward	09/23	/89	City	Steve Faezz	415/784-8090	Safety Spec.	408/988-1111	0.00	137drm, 853 gl pnt	0
California	Fremont	09/23	/89	Fire Dpt & WMNA Oakl			Chem Waste Manage.	415/770-0575	0.00	175 drm,7375 paint	0
California	South Bay	09/23	/89	City & County of SD	Linda Pratt	619/338-2222	Appropriate Tech. II	619/421-1175	0.00		0
California	San Mateo	09/23	/89	SM County Health Dep	Jennifer Stone	415/363-4717	North State Environl	415/588-9652	0.00	cost,waste w/9/21col	95
California	San Mateo	09/28	/89	SM County Health Dep	Jennifer Stone	415/363-4717	North State Environl	415/588-9652	0.00	cost,waste w/9/21col	95
California	San Rafael	09/30	/89	City			Safety Spec.	408/988-1111	0.00	419 drm,2294 gl pnt	1500
California	San Mateo	09/30	/89	SM County Health Dep	Jennifer Stone	415/363-4717	North State Environl	415/588-9652	0.00	cost,waste w/9/21col	95
California	Los Altos Hills	10/	/89	Los Altos Hills	Bill Ekern	415/941-7222			0.00		0
California	Mountain View	10/	/89	Mountain View	Gary Leinweber	415/966-6378			0.00		0
California	Porterville/Visalia	10/04	/89	County			Chem Waste Managemen		0.00	15000 gallons	200
California	San Mateo	10/05	/89	SM County Health Dep	Jennifer Stone	415/363-4717	North State Environl	415/588-9652	0.00	cost,waste w/9/21col	95
California	Mill Valley	10/07	/89	City			Safety Spec.	408/988-1111	0.00		900
California	San Mateo	10/07	/89	SM County Health Dep	Jennifer Stone	415/363-4717	North State Environl	415/588-9652	0.00	cost,waste w/9/21col	95
California	Helendale	10/08	/89	Fire Dept/Lyons Club	Judy Orttung	714/387-4629	CountySanBernardino	714/387-4629	0.00	1drm/55ol/1drmpnt	25
California	San Mateo	10/12	/89	SM County Health Dep	Jennifer Stone	415/363-4717	North State Environl	415/588-9652	0.00	cost,waste w/9/21col	95
California	City of Mountainview	10/14	/89		Bill Ekern	415/941-7222			0.00		0
California	Davis	10/14	/89	City	Gavin Brownlie	408/988-1111	Safety Specialists	408/988-1111	0.00		0
California	East San Diego	10/14	/89	City & County of SD	Linda Pratt	619/338-2222	Appropriate Tech. II	619/421-1175	0.00		300
California	San Mateo	10/14	/89	SM County Health Dep	Jennifer Stone	415/363-4717	North State Environl	415/588-9652	0.00	cost,waste w/9/21col	95
California	San Benito	10/18	/89				House Control		20000.00		0
California	San Mateo	10/19	/89	SM County Health Dep	Jennifer Stone	415/363-4717	North State Environl	415/588-9652	0.00	cost,waste w/9/21col	95
California	Salinas	10/21	/89	Salinas Dispos.Serv.	Al Rossi	408/424-0619	Safety Spec.	408/988-1111	0.00		0
California	Palo Alto	10/21	/89	City	Rosemary Ralston	415/329-2522	Safety Spec.	408/988-1111	0.00		0
California	Sunnyvale	10/21	/89	City	Rich Gurney	408/730-7277	Safety Spec.	408/988-1111	0.00		0
California	San Mateo	10/21	/89	SM County Health Dep	Jennifer Stone	415/363-4717	North State Environl	415/588-9652	0.00	cost,waste w/9/21col	95
California	Los Angls/ElysianPk	10/22	/89	City	Jim Grant	408/988-1111	Safety Specialists	408/988-1111	0.00		0
California	Carlsbad	10/28	/89	Cty & Cnty of San Dg	Linda Pratt	619/338-2222	Appropriate Tech. II	619/421-1175	0.00		0
California	San Mateo	11/04	/89	SM County Health Dep	Jennifer Stone	415/363-4717	North State Environl	415/588-9652	0.00		0
California	Santa Barbara $	11/04	/89	County Santa Barbara	Karen Feeney	805/963-0583	Measure. Sys Enginer	805/987-0217	134000.00		0
California	Needles	11/06	/89	City of Needles	Judy Orttung	714/387-4629	CountySanBernardino	714/387-4629	0.00		0
California	Los Angeles	11/18	/89	City	Jim Grant	408/988-1111	Safety Specialists	408/988-1111	0.00		0
California	Tierrasanta	11/18	/89	Cty & Cnty of San Dg	Linda Pratt	619/338-2222	Appropriate Tech. II	619/421-1175	0.00		0
California	Big Bear	11/18	/89	Fire Dept	Judy Orttung	714/387-4629	Disposal Control	800/824-3345	0.00	3drm/500ol/21drmpnt	150
California	Irvine	12/02	/89	Orange County					0.00		0
California	Kings.Tulare Cnty#	9,10	/89	State Ag Comission	Charles P. Cubbage	517/373/1087			0.00		0
California	Sacramento R!	Sumer	/89	County	Linda Pratt	619/338-2222			0.00		0
California	Mountain View C0	year	/89	Ass. Bay area Govern	Emy Chan Mejorin	415/464-7941			0.00	600 gallons per mont	0
California	Contra Costa C0	year	/89	Ass. Bay area Govern	Emy Chan Mejorin	415/464-7941			0.00		0
Colorado	Boulder County(3dy)^		/89	County Health Dept	George Mathews	303/441-1100			0.00	paint only	0
Colorado	Larimer County*	05/11	/89	County [illegible]	Janelle Henderson	303/221-7712			0.00		0
Colorado	Golden/Lakewood(2dy)	05/20	/89	Jefferson Co HealthD	Rich Fatuzzo	303/278-5845	GSX	800/251-1227	45000.00	86drm/26dmoil/265bat	757
Connecticut	Glastonberry	04/16	/88	Sanitation Dept	Leslie Lewis	(203)566-3489	McDonald & Watson	(401)946-0200	22000.00		448
Connecticut	New Haven	94/23	/88	City	Leslie Lewis	(203)566-3489	Radiac	718 963-2233	20000.00		251
Connecticut	North Haven	04/23	/88	Cons.Commission	Leslie Lewis	(203)566-3489	McDonald & Watson	(401)946-0200	18000.60		220
necticut	Ellington	04/30	/88	Town	Martha Arvasols	(203)875-3088	NE Solvents	(617)683-1002	13095.00	39 drums	110
icut	Gilford/Madison	05/01	/88	Cons.Commission	Leslie Lewis	(203)566-3489	McDonald & Watson	(401)946-0200	24800.00		586
t	Farmington	05/07	/88	Town/ConservCommisn	Liz Dolphin	203/673-8221	Radiac	718-963-2233	19800.00	220sol/750pest/54drm	250
	Avon/3 others	05/07	/88	Health Dept	Leslie Lewis	(203)566 3489	McDonald & Watson	(401)946 0200	22600.00		375
	Darien	05/14	/88	Dept.Pub.Works	Leslie Lewis	(203)656-7365	NE Solvents	(617)683 1002	22850.00	64 drums	300

HOUSEHOLD HAZARDOUS WASTE COLLECTION PROGRAMS BY STATE 1988-1989

STATE	LOCATION	DATE	YEAR	SPONSOR	CONTACT	CPHONE	HAULER	HPHONE	COST	WASTE	PARTICIP
Connecticut	Cheshire	05/14	/88	Town	Leslie Lewis	(203)566-3489	Radiac	718-963-2233	21500.00		185
Connecticut	Shelton/Monroe	05/21	/88	Town	Lynn Werner	(203)736-9277	NE Solvents	(508)683-1002	20875.00	60 drums	325
Connecticut	Groton	05/21	/88	Town	Leslie Lewis	(203)566-3489	McDonald & Watson	(401)946-0200	18000.00		370
Connecticut	Plainville	05/21	/88	Dept.Pub.Works	Leslie Lewis	(203)566-3489	Radiac	718-963-2233	12400.00		80
Connecticut	Niantic	06/04	/88	Town of E. Lyme	George Caulkins	(203)793-8444	NE Solvents	(617)683-1002	20760.00	57 drums	340
Connecticut	Norwich	06/04	/88	Pub.Util.Dept	Leslie Lewis	(203)566-3489	Radiac	718/963-2233	27000.00		200
Connecticut	Waterford/ 2 others	06/04	/88	Dept.Pub.Works	Leslie Lewis	(203)566-3485	Radiac	718/963-2233	0.00		340
Connecticut	CT River RPA	06/04	/88	CT River RPA	Leslie Lewis	(203)566-3489	McDonald & Watson	(401)946-0200	17000.00		300
Connecticut	Southington	09/10	/88	Health Dept			McDonald & Watson	(401)946-0200	0.00		0
Connecticut	Suffield	09/17	/88	Cons.Commission			McDonald & Watson	(401)946-0200	0.00		0
Connecticut	Windsor Locks	09/17	/88	Dept.Pub.Works	Leslie Lewis	(203)566-3489	McDonald & Watson	(401)946-0200	0.00		0
Connecticut	Branford	09/24	/88	Selectmen	Leslie Lewis	(203)566-3489	McDonald & Watson	(401)946-0200	0.00		0
Connecticut	Salsbury/3 others	10/01	/88	NW Govt Council	Leslie Lewis	(203)566-3489	NE Solvents	(617)683-1002	0.00		0
Connecticut	New Britian,Berlin	10/01	/88	DPW	Richard Opulski	(203)224-2491	Clean Harbors	(508)655-7952	0.00		0
Connecticut	N.Branford	10/01	/88	Selectmen	Leslie Lewis	(203)566-3489	McDonald & Watson	(401)946-0200	0.00		0
Connecticut	E. Hartford	10/01	/88	DPW	Rick Toce	(203)289-2781	NE Solvents	(617)683-1002	11475.00		0
Connecticut	Falls Village	10/01	/88	Gov't Council	Pat Ferris	(203)868-7341	NE Solvents	(617)683-1002	17750.00		0
Connecticut	Wallingford	10/15	/88	Town	Leslie Lewis	(203)566-3489	Radiac	(718)963-2233	0.00		0
Connecticut	Wilton	10/22	/88	Cons.Commission	Helen Speck	(203)222-2656	McDonald & Watson	(203)222-2656	0.00		0
Connecticut	Fairfield	10/22	/88	Fire Dept	Leslie Lewis	(203)566-3489	McDonald & Watson	(401)946-0200	0.00		[illegible]
Connecticut	Manchester	10/22	/88	Cons.Commission	Leslie Lewis	(203)566-3489	Radiac	(718)963-2233	0.00		[illegible]
Connecticut	Bristol	10/22	/88	DPW	Leslie Lewis	(203)566-3489	CECOS	(713)584-8824	0.00		0
Connecticut	Wethersfield,Newgton	10/22	/88	Health Dept	Leslie Lewis	(203)566-3489	NE Solvents	(617)683-1002	0.00		0
Connecticut	Stamford	10/29	/88	Sanitation Dept	Leslie Lewis	(203)56603489	McDonald & Watson	(401)946-0200	0.00		0
Connecticut	Stratford	11/05	/88	Cons.Comm.	Mike Kachuba	(203)378-4764	NE Solvents	(617)683-1002	12110.00		0
Connecticut	Reading/2 other loc	11/05	/88	Reg.PlanningAgency	Leslie Lewis	(203)566-3489	McDonald & Watson; &	NE Solvents	0.00		0
Connecticut	Bethel	11/05	/88	Housatonic Officials	Robert J. Halls	(203)775-6256	NE Solvents	(508)683-1002	18720.00		0
Connecticut	Stonington;Milford	11/12	/88	DPW;Health Dept	Leslie Lewis	(203)566-3489	McDonald & Watson	(401)946-0200	0.00		0
Connecticut	Torrington/3 others	11/19	/88	Litchfield Govt Coun	Leslie Lewis	(203)566-3489	McDonald & Watson	(401)946-0200	0.00		0
Connecticut	8 towns	04/01	/89	Mid-St Reg Plng Agy	Leslie Lewis	(203)566-3489			0.00		500
Connecticut	3 towns	04/08	/89	Mansfield, Ashford.	Leslie Lewis	(203)566-3489			0.00		200
Connecticut	3 towns	04/08	/89	Willington	Leslie Lewis	(203)566-3489			0.00		0
Connecticut	New Haven	04/22	/89	City	Leslie Lewis	(203)566-3489	Radiac	718-963-2233	0.00		245
Connecticut	New Britain	04/29	/89	DPW	Richard Opulski	203/224-2491	North East Solvents	508/683-1002	19800.00	40 Drums	0
Connecticut	Glastonbury	04/29	/89	Town	Leslie Lewis	203/566-3489	McDonald & Watson	401/946-0200	0.00		267
Connecticut	New Canaan	04/29	/89	Town	Leslie Lewis	203/566-3489	AETC	201-347-7111	0.00		600
Connecticut	Watertown	05/06	/89	Public Works Dept.	Phil Dileppo	203/274-5411	North East Solvents	508/683-1002	15650.00	31 Drums	133
Connecticut	Windsor, Bloomfield	05/06	/89	Town	Leslie Lewis	203/566-3489	McDonald & Watson	401/946-0200	0.00		350
Connecticut	North Haven	05/13	/89	Town	Leslie Lewis	203/566-3489	McDonald & Watson	401/946-0200	0.00		323
Connecticut	Groton	05/20	/89	Town	Leslie Lewis	203/566-3489	McDonald & Watson	401/946-0200	0.00		310
Connecticut	Norwalk	05/20	/89	Town	Leslie Lewis	203/566-3489	Radiac	718-963-2233	0.00		311
Connecticut	West Hartford	06/03	/89	Town	Leslie Lewis	203/566-3489	NE Solvents	508-683-1002	0.00		435
Connecticut	Norwich	06/03	/89	Town	Leslie Lewis	203/566-3489	Radiac	718-963-2233	0.00		220
Connecticut	Stamford	06/03	/89	Town	Leslie Lewis	203/566-3489	McDonald & Watson	401/946-0200	0.00		500
Connecticut	Ledyard	06/17	/89	Town	Leslie Lewis	203/566-3489	NE Solvents	508-683-1002	0.00	50 people turned awy	127
Connecticut	3 towns	06/17	/89	Town	Leslie Lewis	203/566-3489	NE Solvents	508-683-1002	0.00		260
Connecticut	Southington	09/09	/89	Town	Leslie Lewis	203/566-3489	McDonald & Watson	401-946-0200	0.00		569
Connecticut	7 Towns	09/16	/89	Towns	Leslie Lewis	203/566-3489	McDonald & Watson	401-946-0200	0.00		385
Connecticut	Branford	09/24	/89	Town	Margaret Hall	203/488-8394	MacDonald & Watson	401/946-0200	13806.24		332
Connecticut	Darien	09/30	/89	Town/Board of Health	Leslie Lewis	203/566-3489	NE Solvents	508/683-0200	35745.00	91 drums	415
Connecticut	East Hartford	10/07	/89	Town	Leslie Lewis	203/566-3489	NE Solvents	508/683-1002	0.00		165
Connecticut	Windsor Locks	10/07	/89	Town/DeptPubWorks	Leslie Lewis	203/566-3489	NE Solvents	508/683-1002	0.00		0
Connecticut	Ledyard-supplimental	10/07	/89	Town	Leslie Lewis	203/566-3489	NE Solvents	508/683-1002	0.00		50
Connecticut	Windsor&Bloomfield	10/14	/89	Town	Leslie Lewis	203/566-3489	McDonald & Watson	401-946-0200	0.00		0
Connecticut	Bristol	10/21	/89	Town	Leslie Lewis	203/566-3489	Cecos		0.00		0
Connecticut	Fairfield	10/21	/89	Town	Leslie Lewis	203/566-3489	McDonald & Watson	401-946-0200	0.00		0
Connecticut	Newington	10/21	/89	Town	Leslie Lewis	203/566-3489	Radiac	718-963-2233	0.00		0
Connecticut	Greenwich	10/21	/89	Town	Leslie Lewis	203/566-3489	Radiac	718-963-2233	0.00		[illegible]
Connecticut	Farmington	10/28	/89	Town/ConservComm	Liz Doldhir	203/673-8221	McDonald & Watson	401-946-0200	0.00		190

HOUSEHOLD HAZARDOUS WASTE COLLECTION PROGRAMS BY STATE 1988-1989

STATE	LOCATION	DATE	YEAR	SPONSOR	CONTACT	CPHONE	HAULER	HPHONE	COST	WASTE	PARTICIP
Connecticut	Cheshire	11/04	/89	Town	Leslie Lewis	203/566-3489	Radiac	718-963-2233	0.00		0
Connecticut	Danbury	11/04	/89	Town	Leslie Lewis	203/566-3489	North East Solvents	508/683-1002	0.00		0
Connecticut	New Milford+6 towns	11/11	/89	Town	Leslie Lewis	203/566-3489	NE Solvents	508-683-1002	0.00		0
Connecticut	PleasValleyRefuseDist	11/11	/89				North East Solvents	508/583-1002	0.00		0
Florida	Lake County		/88	County/Conservancy	Don Findell	(904)343-9739	GSX		0.00		0
Florida	Indian R. Cnty		/88	County/Conservancy	Sonny Dean	(305)567-8000			0.00		0
Florida	Escambia Cnty		/88	County/Conservancy	Charlie Miller	(904)968-6628			0.00		0
Florida	Marion County		/88	County/Conservancy	Bill Lycan	(904)245-8833			0.00		0
Florida	Volusia County *		/88	VolusiaEnvironManage	Lindalee Anderson	904-736-5927			60000.00	includes salary	265
Florida	Lake Worth >(2 dy)	01/22	/88	Cnty	Marc Bruner	(305)471-570	GSX	(800)845-1019	0.00		0
Florida	Martin Cnty	04/09	/88	County	Marilis Cary	(407)288-5700	GSX	(800)845-1019	18890.01	84 drums	230
Florida	Palm City >	04/09	/88	Martin Cnty	Marilis Cary	(305)288-5700	Chem Waste	(312) 572-880	0.00		0
Florida	CollierCnty(3 day) >	04/29	/88	County & Conservancy	David Russell	(813)774-8418	GSX	(800)845-1019	47264.59	20000 lbs, 300 gals	301
Florida	Citrus County	06/04	/88	County	Jan Kleman	(904)488-0300	GSX	(800)845-1010	15472.50	23795 lbs	250
Florida	West Palm Beach (2)	06/24	/88	County/Conservancy	Marc Bruner	(305)471-5770	GSX	(800)845-1019	0.00		0
Florida	Lake Worth > (2 dy)	06/24	/88	Palm Beach Cnty	Marc Bruner	(305)471-5770	GSX	(800)845-1019	0.00		0
Florida	Volusia County	07/23	/88	County	Linda Lee Anderson	(904)254-4612	GSX	(800)845-1019	14568.00	12,260 lbs	107
Florida	Brevard Cnty 6 day >	08/15	/88	County	Debbie Lugar	(407)453-8522	GSX	(800)845-1019	142000.00	151,516 lbs	1896
Florida	Gainesville 3 dy >	09/22	/88	Alachua County	Richard Lusk	(904)373-8509	GSX	(800)845-1019	0.00		1500
Florida	Gainesville	09/22	/88	County	Richard Lusk	(904)373-8509	GSX	(800)845-1019	0.00		0
Florida	Citrus County	12/03	/88	County	Liz McCormick	(800)845-1019	GSX	(800)845-1019	0.00		0
Florida	Volusia County	12/10	/88	County	Lindalee Anderson	(904)736-5927	GSX	(813)573-1405	15187.00	20 55-gal drums, etc	125
Florida	Daytona Beach * $		/89	Volusia County	Lindalee Anderson	904/736-5927			0.00		0
Florida	Volusia County *		/89	VolusiaEnvironManage	Lindalee Anderson	904-736-5927			0.00		0
Florida	Perdido Landfill	01/14	/89	Escambia County	Charles Miller	904/968-6628	GSX	800/845-1019	0.00		0
Florida	W. Palm Beach(3days)	02/02	/89	Palm Beach County	Dr. Marc Brunner	407/471-5770	GSX	800/845-1019	0.00		0
Florida	Lee County(2location	03/03	/89	FL DER Amnesty Days	Jeane White	904/487-3892	GSX Services, Inc.	813/573-1405	210313.27	175250 lbs.	1907
Florida	Glades (2 day)	03/07	/89	FL DER Amnesty Days	Jeane White	904/487-3892	GSX Services, Inc.	813/573-1405	6298.00	4000 lbs.	18
Florida	Lee County	03/11	/89	FL DER Amnesty Days	Jeane White	904/487-3892	GSX Services, Inc.	813/573-1405	0.00	125202 lbs.	11670
Florida	Charlotte County	03/11	/89	FL DER Amnesty Days	Jeane White	904/487-3892	GSX Services, Inc.	813/573-1405	72385.08	60475 lbs.	966
Florida	Lee County	03/12	/89	FL DER Amnesty Days	Jeane White	904/487-3892	GSX Services, Inc.	813/573-1405	0.00	50048	740
Florida	Hendry County (2 loc	03/14	/89	FL DER Amnesty Days	Jeane White	904/487-3892	GSX Services, Inc.	813/573-1405	40522.00	24360 lbs.	124
Florida	Hendry County	03/15	/89	FL DER Amnesty Days	Jeane White	904/487-3892	GSX Services, Inc.	813/573-1405	0.00		0
Florida	Sarasota County(2 lo	03/17	/89	FL DER Amnesty Days	Jeane White	904/487-3892	GSX Services, Inc.	813/573-1405	268940.00	189158 lbs.	2556
Florida	Sarasota County	03/18	/89	FL DER Amnesty Days	Jeane White	904/487-3892	GSX Services, Inc.	813/573-1405	0.00		0
Florida	Brevard County (4 da	03/28	/89	Brevard County	Debbie Lugar	407/453-8522	GSX Services, Inc.	813/573-1405	164404.00	153,649 lbs	1814
Florida	Tavares (3days)	03/28	/89	Lake County	Sue Larsen	904/343-9739			26521.00	29,145 lbs	530
Florida	Collier County	03/31	/89	FL DER Amnesty Days	Jeane White	904/487-3892	GSX Services, Inc.	813/573-1405	45319.82	50223 lbs.	508
Florida	Collier County	04/01	/89	FL DER Amnesty Days	Jeane White	904/487-3892	GSX Services, Inc.	813/573-1405	0.00		0
Florida	Dade County(4 locati	04/05	/89	FL DER Amnesty Days	Jeane White	904/487-3892	GSX Services, Inc.	813/573-1405	278471.46	187157 lbs.CntyTotal	1147
Florida	Dade County	04/12	/89	FL DER Amnesty Days	Jeane White	904/487-3892	GSX Services, Inc.	813/573-1405	0.00		0
Florida	Dade County	04/13	/89	FL DER Amnesty Days	Jeane White	904/487-3892	GSX Services, Inc.	813/573-1405	0.00		0
Florida	Lake County (2 days)	04/14	/89	County	Michael Willett	904/343-9738	GSX	800/845-1019	0.00		0
Florida	Dade County (2 day)	04/15	/89	FL DER Amnesty Days	Jeane White	904/487-3892	GSX Services, Inc.	813/573-1405	0.00		0
Florida	Broward County	04/22	/89	FL DER Amnesty Days	Jeane White	904/487-3892	GSX Services, Inc.	813/573-1405	265822.00	183819 lbs.CntyTotal	1370
Florida	Broward County	04/26	/89	FL DER Amnesty Days	Jeane White	904/487-3892	GSX Services, Inc.	813/573-1405	0.00		0
Florida	Broward County	04/29	/89	FL DER Amnesty Days	Jeane White	904/487-3892	GSX Services, Inc.	813/573-1405	0.00		0
Florida	Ft. Lauderdale	04/29	/89	Dade County	Jeane White	904/488-0190	GSX	800/845-1019	0.00		0
Florida	DeLand	04/29	/89	Volusia County	Lindalee Anderson	904/736-5927			14994.00	11,900 lbs	132
Florida	Broward County	04/30	/89	FL DER Amnesty Days	Jeane White	904/487-3892	GSX Services, Inc.	813/573-1405	0.00		0
Florida	Broward County(2day)	05/06	/89	FL DER Amnesty Days	Jeane White	904/487-3892	GSX Services, Inc.	813/573-1405	0.00		0
Florida	Key West (4 days)	05/11	/89	FL DER Amnesty Days	Jeane White	904/488-0190	GSX	800/845-1019	68799.34	28,024 lbs.	117
Florida	Palm Beach County	05/17	/89	FL DER Amnesty Days	Jeane White	904/487-3892	GSX Services, Inc.	813/573-1405	148488.99	92,289 lbs. totals	778
Florida	Clearwater (4dy)	05/18	/89	Pinellas Co DER	Joyce Gibbs	813/462-4761	GSX		0.00		0
ida	Palm Beach County	05/20	/89	FL DER Amnesty Days	Jeane White	904/487-3892	GSX Services, Inc.	813/573-1405	0.00		0
	St. Petersburg	05/20	/89	Pinellas County	Joyce Gibbs	813/462-4761	GSX	800/845-1019	0.00		0
	Palm Beach County	05/24	/89	FL DER Amnesty Days	Jeane White	904/487-3892	GSX Services, Inc.	813/573-1405	0.00		0
	Palm Beach County	05/27	/89	FL DER Amnesty Days	Jeane White	904/487-3892	GSX Services, Inc.	813/573-1405	0.00		0

HOUSEHOLD HAZARDOUS WASTE COLLECTION PROGRAMS BY STATE 1988-1989

STATE	LOCATION	DATE	YEAR	SPONSOR	CONTACT	CPHONE	HAULER	HPHONE	COST	WASTE	PARTICIP
Florida	Lecanto	06/03	/89	Citrus County	George Allen	904/746-8500	GSX	800/845-1019	0.00		0
Florida	Ft. Pierce (3 Days)	06/09	/89	FL DER Amnesty Days	Jeane White	904/488-0190	GSX	800/845-1019	0.00	33335 lbs	615
Florida	Vero Beach (3 days)	06/15	/89	FL DER Amnesty Days	Jeane White	904/488-0190	GSX	800/845-1019	0.00	32432 lbs	380
Florida	Ocla/Marion County	06/24	/89	Marion County	William Lycan		GSX	800/845-1019	0.00		0
Florida	Cantonment	07/22	/89	Escambia County	Sgt. Leo Nelson	904/968-6628			0.00	26,576 lbs.	193
Florida	Juno (3dy)	08/18	/89	Palm Beach County	Marc Bruner	407/471-5570	GSX		0.00		0
Florida	Delray (3dy)	08/25	/89	Palm Beach County	Marc Bruner	407/471-5570	GSX		0.00		0
Florida	Daytona Beach	09/09	/89	Volusia Co Env Cntrl	Linda Lee Anderson	904/254-4612	GSX	803/798-3600	0.00		0
Florida	Orlando (2dy)	09/16	/89	Orange County	Nick Sessic	407/244-7400			123760.00	193,375 lb.	950
Florida	Seminole Co. (2)(4d)	09/30	/89	FL DER Amnesty Days	Jeane White	904/487-3892	GSX Services, Inc.	813/573-1405	0.00		1017
Florida	SeminoleCo/Sanford2d	10/03	/89	FL DER Amnesty Days	Jeane White	904/488-0190	GSX	803/798-2993	0.00		0
Florida	Lake Co. (3)(3+days)	10/10	/89	FL DER Amnesty Days	Jeane White	904/487-3892	GSX Services, Inc.	813/573-1405	0.00		0
Florida	SminolCo/Clrmont(2dy	10/10	/89	FL DER Amnesty Days	Jeane White	904/488-0190	GSX	803/798-2993	0.00		0
Florida	DeLand	10/21	/89	Volusia County	Lindalee Anderson	904/736-5927			0.00		0
Florida	Osceola Co (1)(2dys)	10/28	/89	FL DER Amnesty Days	Jeane White	904/487-3892	GSX Services Inc.	813/573-1405	0.00		0
Florida	Orange Co (2)(4dys)	11/04	/89	FL DER Amnesty Days	Jeane White	904/487-3892	GSX Services Inc.	813/573-1405	0.00		0
Florida	Naples (2dy)	11/10	/89	Collier County	David Russell	813/774-8418			0.00		0
Florida	Brevard Co (3)(3dys)	11/14	/89	FL DER Amnesty Days	Jeane White	904/487-3892	GSX Services Inc.	813/573-1405	0.00	456drums,2350 gals o	23950
Florida	Ocala	11/18	/89	Marion County	Bill Lycan	904/245-8332			0.00		0
Florida	Hillsbo. Co (1)(9d)	12/02	/89	FL DER Amnesty Days	Jeane White	904/487-3892	GSX Services Inc.	813/573-1405	0.00		0
Florida	Inverness	12/02	/89	Citrus County	James Barker	904/746-2694			0.00		0
Florida	Pasco Co (2)(3days)	12/13	/89	FL DER Amnesty Days	Jeane White	904/487-3892	GSX Services Inc.	813/573-1405	0.00		0
Florida	Sanford	Fall	/89	Seminole Co Solid Ws	Chris Papas	407/322-7605			0.00		0
Hawaii	Maui	01/	/88	Env. Qual Control	George Brosky	(808)548-6915	Unitek Env Srvcs	(808)834-1444	13000.00		0
Hawaii	Kauai	03/26	/88	State Env Qual. Dept	Marvin Miura	(808)548-6915			0.00		0
Hawaii	Pearl City	02/24	/89	Dept of Health	Tom Brand	808/548-8837	Unitek Enviro Servic	(808)834-1444	0.00	142 Drum.	0
Hawaii	Honolulu	02/25	/89	Dept of Health	Tom Brand	808/548-8837	Unitek EnviroService	808/834-1444	0.00		0
Hawaii	Waymanalo	03/04	/89	Dept of Health	Tom Brand	808/548-8837	Unitek EnviroService	808/834-1444	0.00		0
Hawaii	Kailahee	03/11	/89	Dept of Health	Tom Brand	808/548-8837	Unitek EnviroService	808/834-1444	0.00	17 drums	0
Hawaii	Kapaa	03/18	/89	Dept of Health	Tom Brand	808/548-8837	Unitek EnviroService	808/834-1444	0.00		0
Hawaii	Kahului (2 day)	04/07	/89	Dept of Health	Tom Brand	808/548-8837	Unitek EnviroService	808/834-1444	0.00	20 drums	0
Hawaii	Hoolehua	04/14	/89	Dept of Health	Tom Brand	808/548-8837	Unitek EnviroService	808/834-1444	0.00	3 drums	0
Hawaii	Hilo	04/29	/89	Dept of Health	Tom Brand	808/548-8837	Unitek EnviroService	808/834-1444	0.00	15 drums	0
Hawaii	Kailuakona	04/29	/89	Dept of Health	Tom Brand	808/548-8837	Unitek EnviroServic	808/834-1444	0.00		0
Idaho	Moscow	04/29	/89	City	Bill Smith	208/882-5553	ChemSafe	509/965-3973	25000.00	21 Drum	270
Idaho	Boise	06/10	/89	Ada County	Ben Lesser	208/334-5879	ChemSafe	509/965-3973	45000.00	42 Drm,750 g. paint	67[illegible]
Illinois	Adams County &	06/03	/88	EPA	James O'Brein	(217)782-3637	GSX	(800)845-1019	30591.50	10,279 lbs	40
Illinois	Quincy	09/17	/88	Town	Chirstina Komadina	(217)333-8956			50000.00	60 drums	270
Illinois	Holmwood/Flossmoore#	09/22	/88	EPA	James O'Brien	(217)782-3637	Chem Waste Mgmt	(312)572-8800	0.00		0
Illinois	Champagne#	09/24	/88	City	Sam Chandler	(217)351-4443	GSX	(800)845-1019	0.00		0
Illinois	Mt Carmel	10/01	/88	Town	Christina Komadina	(217)333-8956	Chem Waste Mgmt	(312)572-8800	0.00		0
Illinois	Homewood	10/22	/88	Town	Christina Komadina	(217)333-8956			0.00		0
Illinois	Brookfield	11/11	/89	IEPA & Brook. Zoo	Bob Casteel	217/782-6761	SET Environ Inc	312/537-9221	50000.00	70drm/oil/paint	129
Indiana	Bloomington Cnty	04/30	/88	Cnty Env. Commission	Julie Kegel	(812)339-2261	GSX	(800)251-1227	25000.00	43 drums	300
Indiana	Indianapolis	05/21	/88	DPW	Sarah Gus	(317)236-4400	Process Engin. Group	(317)243-0182	60000.00	6 SQG +	540
Indiana	Marion Cnty	05/21	/88	DPW	Elva Paulbee	(317)638-1268	Process Engin. Group	(317)243-0182	0.00	5 SQG +	550
Indiana	Bloomington	06/30	/88		Dave Toumey	(812)336-7377	GSX		22000.00		280
Indiana	Indianapolis	09/10	/88	DPW	Sarah Gus	(317)236-4400	Process Engin. Group	(317)243-0812	0.00		500
Indiana	Bloomington	04/29	/89	County	Dave Toumey	812/336-7377	GSX	800/251-1227	23400.00		255
Indiana	Indianapolis	05/20	/89	DPW	Sarah Gus	317/236-4400	Chem Waste Mngmnt	312/396-1050	50000.00		600
Indiana	Elkhart County	05/21	/89	Elkhart County	Bob Kelly	219/264-8015	Industrial Fuels	219/234-0441	0.00		0
Indiana	Indianapolis	09/22	/89	DPW&Co Health Dept	Elva Tolbee	317/638-1269	Chem Waste Manage		0.00		0
Iowa	Lynn County	10/22	/88	County	Liz McCormack	(800)845-1019	GSX	(800)845-1019	0.00		0
Iowa	Story County (2dy)	10/29	/88	County	Liz McCormack	(800)845-1019	GSX	(800)845-1019	0.00		0
Iowa	Montgomery	11/05	/88	County	Liz McCormack	(800)845-1019	GSX	(800)845-1019	0.00		0
Iowa	Waterloo	06/03	/89	BlackHawkCoShCm/IDNR	Barbara Brown	319/266-9722	GSX/Eagle Oil IndSer	800/251-1227	46043.00	100drm/859gal/300p[illegible]	64[illegible]
Iowa	Dennison	06/05	/89	IowaDeptNatRes	Russ Olson	712/263/4697	GSX	800/251-1227	0.00		[illegible]
Iowa	Crawford County	06/1[illegible]	/89	Iowa DNR	Stuart Schmitz	515/281-8499	GSX	800/251-1227	[illegible]	105drm/320gal/[illegible]	[illegible]
Iowa	De Moines(9	09/30	/89	Iowa DNR	TereeCaldwellJohnson	515/244-0021	GSX	800/251-1227	0.00	15[illegible] drum [illegible]	[illegible]

HOUSEHOLD HAZARDOUS WASTE COLLECTION PROGRAMS BY STATE 1988-1989

STATE	LOCATION	DATE	YEAR	SPONSOR	CONTACT	CPHONE	HAULER	HPHONE	COST	WASTE	PARTICIP
Iowa	Council Bluffs	10/07	/89	Iowa DNR	Donn Dierks	712/328-4667	GSX	800/251-1277	60800.00	125 drums	0
Iowa	Spencer	10/07	/89		Dan Payne	712/264-7240	GSX	800/251-1277	52229.00	175 drums	0
Iowa	Iowa City	10/14	/89	Iowa DNR	Marvin Klahn	319/356-6040	GSX	800/251-1277	57610.00	175 drums	0
Iowa	Davenport	10/14	/89		Al Moore	319/326-8615	GSX	800/251-1277	63742.00	120 drums	0
Iowa	Charles City	10/21	/89		David Markle	515/228-7111	GSX	800/251-1277	46580.00		0
Iowa	Delwein	10/21	/89		Walter Manchester	319/283-1105	GSX	800/251-1277	52414.00		0
Iowa	West Union	10/21	/89		Charles Brogammer	319/422-3726			0.00		0
Louisiana	Baton Rouge (5)	05/21	/86	Dow Chemical	Dean Smith	(504)389-1630	Dow Chemical	(504)389-1630	0.00	16000 lb.	0
Louisiana	Lafayette/New Orlean	05/21	/88	Dow Chemical	Dean Smith	(504)389-1630	Dow Chemical	(504)389-1630	0.00	see Baton Rouge	0
Louisiana	Lake Charles	04/15	/89	Co/ClnCtyBd/WstManL(	Judy Weir	318/583-2168	Chem. Waste Mgmt		0.00		6
Louisiana	Baton Rouge (5sites)	06/24	/88	Dow Chemical Inc	Dean Smith	504/389-1630			0.00		0
Maine	South Portland	09/24	/88	Clean Harbors of ME	Guy Lambert	207/799-8111	Clean Harbors of ME	207/799-8111	35434.00	call for info	134
Maine	statewide pickups		/89	Board of Pesticide C	Barbara Lounsbury	207/782-8704			0.00	22 tons	186
Maine	Brunswick	04/29	/89	Brunswick LWV	Joane Saxe	207/865-3648	Clean Harbors of ME	207/799-8111	16000.00	18(55),20(16)Drums·	129
Maryland	Prince Georges	05/22	/88	Solid Waste Division	Karen Napolitano	(301)952-3796	GSX	(800)845-1910	60000.00		230
Maryland	Prince Georges	09/25	/88	Solid Waste Division	Karen Napolitano	(301)952-3796	GSX	(800)845-1910	0.00		170
Maryland	Montgomery	fall	/88	Solid Waste Division	Karen Napolitano	(301)952-3796	GSX	(800)845-1910	0.00		0
Maryland	Anapolis,Glen Barnie	04/08	/89	Arundel County DPW	Richard Waesche	301/551-6103	GSX Services, Inc.	301/953-9583	68315.00	98(55),81(20)Drums·	650
Maryland	Prince Georges Cnty	04/16	/89	County DER	Jonathan Philips	301/952-9583	GSX Services, Inc.	301/952-4615	64230.00	103(55),76(20)Drums·	500
Maryland	Prince Georges Cnty	10/15	/89	County DER	Jonathan Philips	301/952-9583	GSX Services, Inc.	301/953-9583	0.00		500
Maryland	Severn	10/21	/89	Anne Arundel County	Richard Waesche	301/551-6103	GSX	803/798-2993	0.00		0
Maryland	Derwood	10/22	/89	MontgomeryCoGovernm!	Bob Wilson	301/840-2370	GSX	803/798-2993	0.00		0
Massachusetts	Holbrook	04/09	/88	Town/Town Hall	Andy Prasna	767-4616	NE Solvents	(508)683-1002	11900.00	34 drums	250
Massachusetts	Foxborough	04/16	/88	Town Board of Health	Paul Smith	(617)543-2011	NE Solvents	(508)683-1002	10845.00	29 drums	0
Massachusetts	Methuen	04/16	/88	Town	Frank Russo	(508)794-3222	NE Solvents	(508)683-1002	13390.00	36 drums	390
Massachusetts	Shrewsbury	04/23	/88	Town	Bob Jaques	(508)845-3521	NE Solvents	(508)683-1002	11345.00	29 drums	0
Massachusetts	Cambridge	04/23	/88	Dept of Health	Kevin Doherty		Clean Harbors	(508)655-8863	15000.00	1,641 gallons	0
Massachusetts	Groton	04/23	/88	Bd of Health	Dennis Griffin	(508)448-3575	Clean Harbors	(508)655-8863	12025.00	1,016 gallons	57
Massachusetts	Hamilton	04/23	/88	Bd. of Health	Martin Fair	(508)468-4455	Clean Harbors	(508)655-8863	7500.00	716 gallons	0
Massachusetts	West Newbury	04/24	/88	4 towns	Shirley Griffin	(508)363-4407	NE Solvents	(508)683-1002	14140.00	41 drums	158
Massachusetts	Wayland	04/28	/88	Sudbury/Wayland	Mike Guernsey	(508)358-7328	NE Solvents	(508)683-1002	4930.00	14 drums	56
Massachusetts	Andover	04/30	/88	Andover/N. Andover	Everett Penney	(617)689-4350	NE Solvents	(508)683-1002	11940.00	49 drums	0
Massachusetts	Brewster	04/30	/88	Town	Nancy Ellis	(617)896-3701	NE Solvents	(508)683-1002	10795.00	28 drums	0
Massachusetts	Northboro	04/30	/88	Zecco, Inc	Harvey Thomazin	(508)393-2527	NE Solvents	(508)683-1002	9485.00	21 drums	[illegible]
Massachusetts	Fall River	04/30	/88	City	Lt. Miguel Mass.	(508)674-5002	Clean Harbors	(508)655-8863	6175.00	860 gallons	21
Massachusetts	Hanover	05/07	/88	Bd.of Health	Mr. Kruser	(617)826-4611	Clean Harbors	(508)655-8863	15010.00	41 drums	[illegible]
Massachusetts	Lexington	05/07	/88	Town	George Smith	(617)862-0500	NE Solvents	(508)683-1002	6175.00	12 drums	0
Massachusetts	Wayland	05/07	/88	Town of Sudbury	Mike Guerncy	(508)358-7328	NE Solvents	(508)683-1002	9930.00	25 drums	165
Massachusetts	Ipswich	05/07	/88	Health Dept	Dominic Badolato	(508)356-4900	Clean Harbors	(508)655-8863	15000.00	2,346 gallons	206
Massachusetts	Newton	05/09	/88	City	Bruce Elias	(617)552-7175	NE Solvents	(508)683-1002	52950.00	164 drums	458
Massachusetts	Ashland	05/14	/88	Town/Hopkinton/Holl.	Greg Dovan	(617)435-9406	NE Solvents	(508)683-1002	13160.00	36 drums	376
Massachusetts	Hingham	05/14	/88	4 towns/Hlth Board	Daisy	(617)749-0452	NE Solvents	(508)683-1002	23400.00	80 drums	0
Massachusetts	Milford	05/14	/88	Town	Paul Mazzuchili	(617)473-0023	NE Solvents	(508)683-1002	23665.00	77 drums	0
Massachusetts	Natick	05/14	/88	Town	Roger Wade	(508)651-7244	Clean Harbors	(508)655-8863	17285.00	2,276 gallons	0
Massachusetts	Whitman	05/14	/88	Bd. of Health		(617)447-0209	Clean Harbors	(508)655-8863	10805.00	1,139 gallons	0
Massachusetts	Wayland	06/17	/88	Sudbury/Wayland	Mike Guernsey	(508)358-7328	NE Solvents	(508)683-1002	6520.00	20 drums	74
Massachusetts	Agawam	05/21	/88	Town	Ron Young	(413)786-0400	NE Solvents	(508)683-1002	15010.00	46 drums	0
Massachusetts	Framingham	05/21	/88	Town Board of Health	Bob Cooper	(617)620-4891	NE Solvents	(508)683-1002	20015.00	63 drums	232
Massachusetts	Westfield	05/21	/88	Town	Mr. J.T. Coniff	(413)568-9181	Clean Harbors	(508)655-8863	17315.00	2,296 gallons	0
Massachusetts	Norwood	05/21	/88	Town	Paul Hennebery	(617)762-1242	Clean Harbors	(508)655-8863	12000.00	1,685 gallons	198
Massachusetts	Boston	05/21	/88	City Env.Dept.	Denise Brightenecker	(617)725-4417	Clean Harbors	(508)655-8863	6825.00	814 gallons	0
Massachusetts	Edgartown	05/24	/88	Refuse & Resrce Rec	Kate Gage	(508)693-3479	NE Solvents	(508)683-1002	4200.00	14 drums	0
Massachusetts	Weymouth	05/28	/88	DPW	Frank Lagrotteria	(617)337-5100	Clean Harbors	(508)66508863	34362.50	3,227 gallons	0
Massachusetts	Chicopee	05/28	/88	City	Stanley Kulig		Clean Harbors	(508)655-8863	36442.40	3,421 gallons	0
ssachusetts	Burlington	06/04	/88	Town	Dick Combard	(617)672-6700	NE Solvents	(508)683-1002	14640.00	41 drums	0
chusetts	Gardner	06/04	/88	Town/Reg. Plann Comm	Kathy Kelly		NE Solvents	(508)683-1002	14240.00	42 drums	[illegible]
setts	Woburn	06/04	/88	City	Bill McGowen	(617)932-4500	Clean Harbors	(508)655-8863	26017.82	3,024 gallons	[illegible]

HOUSEHOLD HAZARDOUS WASTE COLLECTION PROGRAMS BY STATE 1988-1989

STATE	LOCATION	DATE	YEAR	SPONSOR	CONTACT	CPHONE	HAULER	HPHONE	COST	WASTE	PARTICIP
Massachusetts	Bernardston	06/11	/88	Cnty Comm. Office	Lynn Rubenstein	(413)774-3167	NE Solvents	(508)683-1002	5340.00	18 drums	0
Massachusetts	Bristol	06/11	/88	Lakes Rgn Plan Comm	Kim Koulet	(603)744 2441	NE Solvents	(508)683-1002	14925.00	39 drums	0
Massachusetts	Buckland	06/11	/88	Town/Cty Comm Office	Lynn Rubenstein	(413)774-3167	NE Solvents	(508)683-1002	6035.00	20 drums	0
Massachusetts	Deerfield	06/11	/88	Town/Cty Comm Office	Lynn Rubinstein	(413)774-3167	NE Solvents	(508)683-1002	7890.00	27 drums	0
Massachusetts	Orange	06/11	/88	Town/Cty Comm Office	Lynn Rubinstein	(413)774-3167	NE Solvents	(508)683-1002	4690.00	16 drums	0
Massachusetts	Wayland	06/11	/88	Sudbury/Wayland	Mike Guernsey	(508)358-7328	NE Solvents	(508)683-1002	11890.00	32 drums	144
Massachusetts	Stoughton	06/11	/88	Town	James Conlon	(617)344-2432	Clean Harbors	(508)655-8863	18820.00	2,403 gallons	0
Massachusetts	Attleboro	06/11	/88	Town	James Mooney	(508)222-9610	Clean Harbors	(508)655-8863	21210.00	2,681 gallons	0
Massachusetts	Plymouth	06/11	/88	Town	Robert Canevazzi	(617)747-1620	Clean Harbors	(508)655-8863	14075.00	1,990 gallons	0
Massachusetts	Harwich	06/18	/88	Cape Plan/Devt Comm	Paula Champagne	(617)430-0815	NE Solvents	(508)583-1002	14895.00	35 drums	0
Massachusetts	Hudson	06/18	/88	Town	Chief Garrity	(508)562-5565	NE Solvents	(508)683-1002	9930.00	25 drums	244
Massachusetts	Wellfleet	06/18	/88	Cape Plan/Devt Comm	John Chatham	(508)349-3702	NE Solvents	(508)683-1002	12530.00	30 drums	0
Massachusetts	Yarmouth	06/18	/88	Cape Plan/Devt Comm	Bruce Murphy	(508)398-2231	NE Solvents	(508)683-1002	16860.00	41 drums	0
Massachusetts	Peabody	06/18	/88	Town	Peter Angeramo	(508)532-3000	Clean Harbors	(508)655-8863	19422.50	2,508 gallons	150
Massachusetts	Saugus	06/18	/88	Town	Joe Giancola	(617)233-7002	Clean Harbors	(508)655-8863	8425.00	8[illegible] gallons	63
Massachusetts	Boston-Jamaica Plain	06/18	/88	City	Denise Brightenecker	(617)725-4417	Clean Harbors	(508)655-8863	12377.50	1,372 gallons	0
Massachusetts	W. Barnstable	06/25	/88	Cape Plan/Devt Comm	Donna Miorardy	(617)775-1120	NE Solvents	(508)683-1002	17325.00	43 drums	0
Massachusetts	East Falmouth	06/25	/88	Cape Plan/Devt Comm	Donna Miorardy	(617)775 1120	NE Solvents	(508)683-1002	14745.00	35 drums	0
Massachusetts	Lee	06/25	/88	Town	Diane Lamber	(413)243-2100	NE Solvents	(508)683-1002	5745.00	11 drums	0
Massachusetts	Newburyport	06/25	/88	City	John Davey	(508)930-6289	NE Solvents	(508)683-1002	12235.00	31 drums	0
Massachusetts	Waltham	06/25	/88	City	Bob Ballloux	(617)893-4040	NE Solvents	(508)683-1002	7485.00	16 drums	0
Massachusetts	Wakefield	06/25	/88	Bd. of Health	Jim Nugent	(617)246-6375	Clean Harbors	(508)655-8863	3915.00	2,224 gallons	0
Massachusetts	Lunenburg, 2 others	06/25	/88	Town	Bonnie Hathaway		Clean Harbors	(508)655-8863	9400.00	1,040 gallons	0
Massachusetts	Boston: Alston,Bri.	06/25	/88	City	Denise Brightenecker	(617)725-4417	Clean Harbors	(508)655-8863	13865.00	1,795 gallons	0
Massachusetts	Scituate	06/30	/88	Higham Brd of Slctmn	Joe Godzik	(617)545-3300	NE Solvents	(508)683-1002	12975.00	37 drums	0
Massachusetts	Westport	08/06	/88	Selectmen	Anne Barnes	(508)636-4521	NE Solvents	(508)683-1002	8725.00		0
Massachusetts	Martha's Vineyard*	09/	/88	Town	Kate Gage	(508)693-3479	NE Solvents	(508)683-1002	0.00		0
Massachusetts	Northampton, 2 day	09/09	/88	Pioneer Planning Com	Chris Curtis	(413)781-6045	NE Solvents	(508)683-1002	50750.00		0
Massachusetts	Springfield	09/10	/88	Town/DEM	Raymond Turgeon	(413)787-6224	Clean Harbors	(508)655-8863	46510.00	454[illegible] gallons	0
Massachusetts	Goshen	09/10	/88	Pioneer Planning Com	Chris Curtis	(413)781-6045	NE Solvent	(508)683-1002	0.00		0
Massachusetts	Bedford	09/17	/88	Bd. of Health	Carla Priest	(508)275-6507	Clean Harbors	(508)655-8863	0.00		0
Massachusetts	Somerville	09/17	/88	Health Dept	Paul Murphy	(617)625-6600	Clean Harbors	(508)655-8863	408350.00	5804 gallons	211
Massachusetts	Brockton, 4 others	09/17	/88	Cons. Commiss.	Caroline Stone	(508)580-7167	NE Solvents	(508)683-1002	24200.00		0
Massachusetts	Haverhill	09/17	/88	Bd. of Health	John Connor	(508)374-2381	NE Solvents	(508)682-1002	13990.00		0
Massachusetts	Amherst	09/19	/88	Pioneer Planning Com	Alison Lescher	(413)781-6045	NE Solvents	(508)683-1002	0.00		0
Massachusetts	Reading	09/24	/88	Bd. of Health	Ruth Cogan	(617)942-0500	Clean Harbors	(508)655-8863	11750.00	1,45[illegible] gallons	0
Massachusetts	Wrentham	09/24	/88	Cons. Comm.	Maureen Osoluth	(508)565-1500	NE Solvents	(508)683-1002	0.00		0
Massachusetts	Acton, 3 others	09/24	/88	Bd. of Health	Debbie Malko	(508)264-9634	NE Solvents	(508)683-1002	17475.00		0
Massachusetts	Norfolk	10/01	/88	Bd. of Health	Janet Preavitt	(508)528-7747	NE Solvents	(508)683-1002	5300.00		0
Massachusetts	Chatham	10/08	/88	Board of Health	Jane	(508)945-2100	NE Solvents	(508)683-1002	9275.00		0
Massachusetts	Billerica	10/15	/88	N.Middlesex Commiss.	Robert W. Flynn	(508)454-8021	Clean Harbors	(508)655-1800	0.00		0
Massachusetts	Peabody	10/15	/88	Board of Health	Peter Angeramo	(508)532-3000	NE Solvents	(508)683-1002	14000.00		0
Massachusetts	Norwell	10/15	/88	Fire Department	Chief Cavanaugh	(617)659-2211	NE Solvents	(508)683-1002	10200.00		0
Massachusetts	Dartmouth	10/22	/88	Cons.Commiss.	Robert College	(413)999-0722	Clean Harbors	(508)655-8863	0.00		0
Massachusetts	Boxford, 2 others	10/22	/88	Town	Ira Singer	(508)777-3617	Clean Harbors	(508)655-8863	0.00		0
Massachusetts	Weston	10/29	/88	Selectmen	Donna Vanderclark	(617)893-7320	Clean Harbors	(508)655-8863	0.00		0
Massachusetts	Lexington	10/29	/88	Board of Health	George Smith	(617)862-0500	NE Solvents	(508)683-1002	28675.00		0
Massachusetts	Watertown	10/29	/88	Health Dept.	Donna Moultrup	(617)484-2352	NE Solvents	(508)683-1002	17650.00		0
Massachusetts	Canton	10/29	/88	Board of Health	Robert Enos	(617)821-5021	NE Solvents	(508)683-1002	14400.00		0
Massachusetts	Winchester	11/05	/88	Bd. of Health	Joseph Tabbi	(617)721-7122	Clean Harbors	(508)655-8863	0.00		0
Massachusetts	Middleborough	11/05	/88	Town	Donna Dean		Clean Harbors	(508)655-8863	0.00		0
Massachusetts	Williamstown	11/05	/88	Town	Steven L. Ledoux	(413)458-4835	NE Solvents	(508)683-1002	7525.00		0
Massachusetts	Walpole	11/12	/88	Town	Robin Chapell	(617)668-5400	Clean Harbors	(508)655-8863	0.00		0
Massachusetts	Dedham	11/12	/88	Town	Frank J. Scerti	(508)326-0540	Clean Harbors	(508)655-8863	0.00		0
Massachusetts	Concord	11/12	/88	Board of Health	Carol Fox	(508)371-1034	NE Solvents	(508)683-1002	9550.00		0
Massachusetts	Tewksbury	11/12	/88	Board of Health	Bill McNamara	(508)851-6371	NE Solvents	(508)683-1002	8725.00		0
Massachusetts	Weymouth	11/12	/88	Public Works Dept	James Clarke	(617)335-2000	NE Solvents	(508)683-1002	2032[illegible]		0
Massachusetts	Norton, [illegible] others	11/15	/88	SRPEDD Reg. Planning	[illegible] Napolitano	(508)824-1367	Clean Harbors	(508)655-8863	0.00		[illegible]
Massachusetts	Barnstable	11/19	/88	Town	Russell Davenport	(508)775-1120	NE Solvents	(508)683-1002	[illegible]		[illegible]

HOUSEHOLD HAZARDOUS WASTE COLLECTION PROGRAMS BY STATE 1988-1989

STATE	LOCATION	DATE	YEAR	SPONSOR	CONTACT	CPHONE	HAULER	HPHONE	COST	WASTE	PARTICIP
Massachusetts	Amesbury	11/19	/88	Town	Theresa Leblanc	(508)388-0426	NE Solvents	(508)683-1002	12225.00		0
Massachusetts	Greenfield	11/19	/88	Town	Sandra Shields	(413)773-3578	NE Solvents	(508)683-1002	16600.00		0
Massachusetts	Wilmington	12/03	/88	Town	Bob Palmer	(508)658-4481	NE Solvents	(508)683-1002	24675.00		0
Massachusetts	North Reading	12/03	/88	Town	Joan Stevens	(508)664-5731	NE Solvents	(508)683-1002	1200.00		0
Massachusetts	Nantucket	12/10	/86	Public Works Dept.	Elise Nawrocki	(508)228-7244	NE Solvents	(508)683-1002	28200.00		0
Massachusetts	Martha's Vineyard*		/89	MVDRRD	Paul Mannigan	508/693-3479	North East Solvents	508/683-1002	0.00	22 Drums	94
Massachusetts	Sturbridge *		/89		George Berry	508/347-2604			0.00		0
Massachusetts	Concord	01/18	/89	Board of Health	Brad Leader	508/371-1034	North East Solvents	508/683-1002	9350.00	22 drums	0
Massachusetts	Arlington	04/08	/89	Town Managers Office	Theresa Henchy	617/646-1000	North East Solvents	508-683-1002	7975.00	14 drums	0
Massachusetts	Foxborough	04/08	/89	Board of Health	George Young	508/543-2011	North East Solvents	508-683-1002	15075.00	37 drums	0
Massachusetts	Nantucket	04/08	/89						0.00		0
Massachusetts	Danvers	04/15	/89	Board of Health	Tracy Flagg	508/777-0001	North East Solvents	508/683-1002	15400.00	35 drums	0
Massachusetts	Lee/Stockbridge	04/15	/89	Health Department	Dianne Larribee	413/243-2100	North East Solvents	508/683-1002	7450.00	15 drums	0
Massachusetts	Scituate	04/15	/89	Board of Health	Jennifer Lams	617/545-6700	North East Solvents	508/683-1002	13425.00	27 drums	0
Massachusetts	Ashby/Townsend	04/15	/89	Board of Health	Linda Fasciano	508/597-5661	Northeast Solvents	508/683-1002	8525.00	16 drums	0
Massachusetts	Marshfield	04/15	/89	Town	George Shaw	617/837/5141	Clean Harbors Natick	508/655-8863	13500.00	1167gal,LP:495gal,CL	0
Massachusetts	Methuen	04/22	/89	DPW	Frank Russo	508/794-3222	North East Solvents	508/683-1002	21925.00	58 drums	0
Massachusetts	Littleton	04/22	/89	Board of Selectmen	Allen Delaney	508/486-3778	North East Solvents	508/683-1002	14375.00	33 drums	0
Massachusetts	Weymouth	04/22	/89	DPW	Joe Mazzotta	617/337-5100	Clean Harbors Natick	508/655-8863	36840.00	2229gal,LP:440gal,CL	0
Massachusetts	Groton	04/22	/89	Dennis Griffin					0.00		0
Massachusetts	Brewster	04/29	/89	Board of Health	Nancy Ellis	508/896-3701	North East Solvents	508/683-1002	12500.00	27 drums	0
Massachusetts	Oxford	04/29	/89	DPW	Nick Roos	508/987-2651	North East Solvents	508/683-1002	9650.00	19 Drums	0
Massachusetts	South Hadley	04/29	/89	Board of Health	Phyllis Pattison	413/538-5033	North East Solvents	508/683-1002	16700.00	38 Drums	0
Massachusetts	Cambridge	04/29	/89	City Purchasing Dept	Barbara Duffy	617/498-1486	Clean Harbors Natick	508/655-8863	25525.00	1684gal,LP:495gal,CL	0
Massachusetts	Needham	04/29	/89	DPW	Peter Sellers	617/455/7550	Clean Harbors Natick	508/655-8863	42287.00	3669gal,LP;275gal,CL	0
Massachusetts	West Springfield	04/29	/89	Board of Health	Al Laboranti	413/781/7550	Clean Harbors Natick	508/655-8863	24040.00	1752gal,LP;275gal,CL	0
Massachusetts	Boylston	05/05	/89	Board of Health	Dan Duffy	413/538-5033	North East Solvents	508/683 1002	7075.00	11 Drums	0
Massachusetts	Newton	05/06	/89	DPW	Bruce Elias	617/552-7201	North East Solvents	508/683-1002	326775.00	80 Drums	0
Massachusetts	Ipswich	05/06	/89	Board of Health	Dominic Balalade	508/356-4900	Clean Harbors Natick	508/655-8863	19750.00	1501gal,LP,550gal,CL	0
Massachusetts	Hanover	05/06	/89	Board of Health	M. Kruser	617/826/4611	Clean Harbors Natick	508/655-8863	19425.00	1429gal,LP;165gal,CL	0
Massachusetts	Ashland	05/13	/89	Tritown HHW Committe	Beverly Dort	508/881-1009	North East Solvents	508/683-1002	14675.00	33 Drums	0
Massachusetts	Norwood	05/13	/89	Board of Health	Phyllis Boucher	617/762-1240	North East Solvents	508/683-1002	15150.00	34 Drums	0
Massachusetts	Lincoln	05/13	/89	Board of Health	Allison Morse	617/259-8850	North East Solvents	508/683-1002	22450.00	55 Drums	0
Massachusetts	Hamilton	05/13	/89	Board of Health	Bob Germano	508/526-7385	Clean Harbors Natick	508/655-8863	3500.00	646gal,LP, 165gal,CL	53
Massachusetts	Fairhaven	05/13	/89	Board of Health	Patricia Fowle	599/997-0382	Clean Harbors Natick	508/655-8863	34865.00	2057gal,LP,330gal,CL	0
Massachusetts	Woburn	05/13	/89	Board of Health	Bill McGowan	617/932-4500	Clean Harbors Natick	508/655-8863	13060.00	1254gal,LP,275gal,CL	0
Massachusetts	Holden	05/20	/89	Board of Health	John Westerling	508/829-6561	North East Solvents	508/683-1002	0.00	24 Drums	0
Massachusetts	Agawam	05/20	/89	Board of Health	Ronald Young	413/786-0400	North East Solvents	508/683-1002	0.00	39 Drums	0
Massachusetts	Amherst	05/20	/89	Board of Health	Bettye Anderson	413/253-3277	North East Solvents	508/683-1002	13125.00	25 Drums	0
Massachusetts	Barnstable	05/20	/89	DPW	Rusell Davenport	508/775-1120	North East Solvents	508/683-1002	15400.00	33 Drums	0
Massachusetts	Wayland/Sudbury	05/20	/89	Board of Health	Mike Guernsey	508/443-6076	North East Solvents	508/683-1002	20000.00	50 Drums	0
Massachusetts	Worcester	05/20	/89	DPW	Richard Schnorf	508/799-1430	Clean Harbors Natick	508/655-8863	11900.00	4495gal,LP;385gal,CL	0
Massachusetts	Brockton	05/20	/89						0.00		0
Massachusetts	Wilmington	05/29	/89	Board of Health	Bob Palmer	508/658-4481	North East Solvents	508/683-1002	17250.00	45 Drums	0
Massachusetts	Stoughton	06/03	/89		Phillip Farrington	617/341-1300			0.00		0
Massachusetts	Westfield	06/03	/89		Daniel Reardon	413/568-9181			0.00		0
Massachusetts	Nantucket	06/03	/89						0.00		0
Massachusetts	New Bedford	06/10	/89	DPW	Kathleen Burns	508/999-2931	Clean Harbors Natick	508/655-8863	10805.00	1020gal,LP;110gal,CL	0
Massachusetts	Northampton	06/10	/89	Board of Health	Peter McErlain	413/586-6950	Clean Harbors Natick	508/655-8863	12975.00	973gal,LP; 220gal,CL	0
Massachusetts	Pepperel	06/10	/89		Sheryl Ross	617/433-6700			0.00		0
Massachusetts	Burlington	06/10	/89		Mr. R Lombard				0.00		0
Massachusetts	Pembroke	06/10	/89		James Morrissey	617/293-2718			0.00		0
Massachusetts	Peabody	06/16	/89	Dept of Human Servs.	Peter Angeramo	508/532-3000	Clean Harbors Natick	508/655-8863	0.00		0
achusetts	Canton	06/16	/89	Board of Health	Bob Enos	617/821-5021	Clean Harbors Natick	508/655-8863	0.00		0
usetts	Sturbridge	06/17	/89	Board of Health	George Berry	508 347 2504	North East Solvents	508-683-1002	0.00		0
tts	Newburyport	06/17	/89		Steven Fram	508/465-4410			0.00		0
	Hudson	06/24	/89		Thomas Garrity	508/562-5565			0.00		0

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E	LOCATION	DATE	YEAR	SPONSOR	CONTACT	CPHONE	HAULER	HPHONE	COST	WASTE	PARTICIP
Massachusetts	Bedford	09/09	/89	Town Board of Health	Carla Priest	508/275-6607	Clean Harbors Natick	508/655-8863	17956.25	1577glchem,275glpnt	0
Massachusetts	Sekonk/Rehoboth	09/09	/89	TnSeek/RoBdHealth	Many Mello	508/336-8510	Clean Harbors Natick	508/655-8863	26050.00	2552glchem/275glpnt	0
Massachusetts	Chatham	09/09	/89	Board of Health	Terence Mayes	508/945-2100	North East Solvents	508/583-1002	12950.00	28 drums	0
Massachusetts	Brockton	09/16	/89	City	Caroline Stone		Clean Harbors Natick	508/655-8863	25742.40	2360glchem/440glpnt	0
Massachusetts	Salem	09/16	/89	City	Robert Blenkhorn	508/741-1800	Clean Harbors Natick	508/655-8863	28967.50	3094glchem/275glpnt	0
Massachusetts	Sturbridge	09/16	/89	Board of Health	George Berry	508/347-7291	North East Solvents	508/583-1002	2975.00	4 drums	0
Massachusetts	Tewksbury	09/23	/89	Town Board of Health	William L. Lindsey	508/851-6371	Clean Harbors Natick	508/655-8863	14815.00	1614gcm/440ol/110pnt	0
Massachusetts	Newton	09/23	/89	Dept of Public Works	Bruce Elias	617/552-7201	North East Solvents	508/583-1002	44100.00	112 drums	0
Massachusetts	Andover	09/23	/89	Board of Health	Everett Penney	508/470-3800	North East Solvents	508/583-1002	20625.00	55 drums	0
Massachusetts	Harvard, Mass.	09/23	/89	Town of Harvard	John Petrin	508/456-3995	Clean Harbors Natick	508/655-8863	30775.00	2793 gal chemicals	0
Massachusetts	Danvers	09/30	/89	Board of Health	Tracy Flagg	508/777-0001	North East Solvents	508/583-1002	10925.00	20 drums	0
Massachusetts	Wilbraham	09/30	/89	Town	Jim Gagnon	508/596-6059	North East Solvents	508/583-1002	30175.00	75 drums	0
Massachusetts	Norfolk	10/07	/89						0.00		0
Massachusetts	Hingham	10/07	/89	Board of Selectmen	Daisy Janey	617/749-0452	North East Solvents	508/583-1002	0.00		0
Massachusetts	Plymouth	10/14	/89		Robert Canevazzi	617/747-1620			0.00		0
Massachusetts	Walpole	10/14	/89		George Young	617/665-5400	North East Solvents	508/583-1002	0.00		0
Massachusetts	Barre	10/14	/89				North East Solvents	508/583-1002	0.00		0
Massachusetts	Belmont/Watertown	10/14	/89	Board of Health	Donna Moultrup	617-484-2357	North East Solvents	508/583-1002	0.00		0
Massachusetts	Truro	10/14	/89						0.00		0
Massachusetts	Weston	10/21	/89	Town	Selectmen	617/893-7320	Clean Harbors Natick	508/655-8863	50000.00		0
Massachusetts	Haverhill	10/21	/89				North East Solvents	508/583-1002	0.00		0
Massachusetts	Strubridge'	10/21	/89	Board of Health	George Berry	508-347-2504	North East Solvents	508/583-1002	0.00		0
Massachusetts	Lexington	10/28	/89	Board of Health	George Smith	617-862-0500	North East Solvents	508/583-1002	0.00		0
Massachusetts	Franklin Cnty 4 site	10/28	/89	Franklin County	Gisela Walker	413-774-2902			0.00		0
Massachusetts	Billerica	10/28	/89	Town	Evelyn Maines	617/454-8021	Clean Harbors Natick	508/655-8863	14200.00		0
Massachusetts	Norton	10/28	/89	Board of Health	Harold Chenevert Jr.	508/285-6301	Clean Harbors Natick	508/655-8863	8300.00		0
Massachusetts	Chelmsford	11/04	/89		Richard Day	508/256-2061	North East Solvents	508/583-1002	0.00		0
Massachusetts	Bellingham	11/04	/89	Board of Health	Ed Wirtanen	508/966-2070	Clean Harbors Natick	508/655-8863	10000.00		0
Massachusetts	Kingston	11/11	/89	Board of Health	Henny Walters	617/585-0503	Clean Harbors Natick	508/655-8863	0.00		0
Massachusetts	Williamstown	11/11	/89		Steven Ledoux	413/458-3500	North East Solvents	508/583-1002	0.00		0
Massachusetts	Boxford	11/11	/89		Thomas Hauenstein	617/887-8181	North East Solvents	508/583-1002	0.00		0
Massachusetts	Concord	11/11	/89		Jacqueline Kelly	508/369-6700	North East Solvents	508/583-1002	0.00		0
Massachusetts	Somerville	11/18	/89				North East Solvents	508/583-1002	0.00		0
Massachusetts	Waltham	11/18	/89				North East Solvents	508/583-1002	0.00		0
Massachusetts	Barnstable	11/18	/89	DPW	Russell Davenport	508-775-1120	North East Solvents	508/583-1002	0.00		0
Massachusetts	Norwell	11/18	/89		Chester Horte	617/659-8016	North East Solvents	508/583-1002	0.00		0
Massachusetts	Nantucket	12/09	/89				North East Solvents	508/583-1002	0.00		0
Michigan	Ingham County'		/88	County	Bob Ceru	(517)887-6988	Drug & Lab	(616)685-9824	0.00		0
Michigan	Macomb Cnty'	02/05	/88	Health Dept/county	Bob Mac Donald	469-5236	Spec'l Waste Systems		0.00		0
Michigan	Kent County'	04/	/88	County	Donna Engstrom	(616)774-6892	Drug & Lab	(616)685-9824	0.00		0
Michigan	Monroe County #	04/23	/88	Cnty	Chuck Cubbage	(517)373-1031	Drug & Lab	(616)685-9824	0.00	61 kg, 73 liters	26
Michigan	Delta/Menominee Cnty	04/30	/88	County	Jan VanAmberg	(906)786-4111	Drug & Lab	(616)685-9824	7755.94	2047 kg	100
Michigan	Washtenaw'	05/	/88	Dept of Public Hlth.	Steve Manville	(313)994-2492	Drug and Lab, Inc.	(616)685-9824	0.00		0
Michigan	St. Clair	05/07	/88		Lisa Blizinger	(313)987-4884	Drug & Lab	(616)685-9824	11670.70		0
Michigan	Eaton County	05/21	/88	County	Bob Shaeffer	(517)543-2430	Drug & Lab	(616)685-9824	0.00		0
Michigan	Marquette County	05/21	/88	County	Frank Woodward	(906)475-4195	Drug & Lab	(616)685-9824	12277.75		0
Michigan	Kalamazoo County'	07/	/88	County	Dean Malub	(616)383-8863	Drug & Lab	(616)685-9824	0.00		0
Michigan	Holland	10/01	/88	City	Roger Stroh	(616)394-1365	Drug & Lab	(616)685-9824	0.00		0
Michigan	Allegan County #	10/08	/88	County	Bill Hinz	(616)673-5411	Drug & Lab	(616)685-9824	0.00	25 kgs, 100 liters	35
Michigan	Branch, 2 others	10/15	/88	Counties	Rhonda Sybesma	(616)685-9824	Drug & Lab	(616)685-9824	0.00		0
Michigan	Livingston County #	10/15	/88	County	Chuck Cubbage	(517)373-1031	Drug & Lab	(616)685-9824	0.00		0
Michigan	Chippewa,2others,2dy	10/26	/88	Counties	Rhonda Sybesma	(616)685-9824	Drug & Lab	(616)685-9824	0.00		0
Michigan	Upper Penins.,6cnty#	10/26	/88	Counties	Chuck Cubbage	(517)373-1031	Drug & Lab	(616)685-9824	0.00		0
Michigan	St. John	10/29	/88	City	Roy Anklam	(517)224-7898	Drug & Lab	(616)685-9824	0.00		62
Michigan	statewide collection	11	/88	MI Txc Sbsnc Cntl Co	Charles P. Cubbage	517/373-1807			39900.00	21,000 pounds	67
Michigan	Traverse City #	11/03	/88	Cnty Extension Serv.	Chuck Cubbage	(517)373-1031	Drug & Lab	(616)685-9824	0.00	1800 kg, 12 liters	50
Michigan	Lapeer County	11/12	/89	County	Joyce Muz	(313)667-0201	Drug & Lab	(616)685-9824	22741.15	1553kg, 360 gal oil	132
Michigan	N. Mich.,4 counties#	11/25	/89	Counties	Chuck Cubbage	(517)373-1031	Drug & Lab	(616)685-9824	0.00		0
Michigan	Kalamazoo County'#		/89	County	Tom Dewhirst	616/353-8863			0.00		0

HOUSEHOLD HAZARDOUS WASTE COLLECTION PROGRAMS BY STATE 1988-1989

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Michigan	Kent County'		/89	County	Donna Engstrom	616/774-6892			0.00		0
Michigan	Ingham County'		/89	County	Bob Cere	517/887-6988			0.00		0
Michigan	Macomb County'		/89	County	Robert MacDonald	313/469-5236			0.00		0
Michigan	Washtenaw County	03/18	/89	County Health Dept.	Steven Manville	313/994-2457	Drug & Lab. Disposal	616/685-9824	12964.85	2585 liters, 550 kg	0
Michigan	Washtenaw County	04/19	/89	County Health Dept.	Steven Manville	313/994-2457	Drug & Lab. Disposal	616/685-9824	0.00		0
Michigan	Bay City	04/27	/89	DowChem/BayCoHlthDpt	Robert Hill	517/894-0645	Dow Chemical Mich	517/636-6766	0.00		0
Michigan	Saginaw	04/27	/89	DowChem/SagCoHlthDpt	Don Orth	517/771-0829	Dow Chemical Mich	517/636-6766	0.00		0
Michigan	Washtenaw County	05/17	/89	County Health Dept.	Steven Manville	313/994-2457	Drug & Lab	616/685-9824	0.00		0
Michigan	Bay City	05/31	/89	DowChem/BayCoHlthDpt	Robert Hill	517/894-0645	Dow Chemical Mich	517/636-6766	0.00		0
Michigan	Saginaw	05/31	/89	DowChem/SagCoHlthDpt	Don Orth	517/771-0829	Dow Chemical Mich	517/636-6766	0.00		0
Michigan	Holland	06/14	/89	City	Roger Stroh	616/394-1365	Drug & Lab	616/685-9824	4514.00		0
Michigan	Bay City	06/22	/89	DowChem/BayCoHlthDpt	Robert Hill	517/894-0645	Dow Chemical Mich	517/636-6766	0.00		0
Michigan	Saginaw	06/22	/89	DowChem/SagCoHlthDpt	Don Orth	517/771-0829	Dow Chemical Mich	517/636-6766	0.00		0
Michigan	Holland	07/06	/89	City	Roger Stroh	616/394-1365	Drug & Lab	616/685-9824	3490.00		0
Michigan	Bay City	08/05	/89	DowChem/BayCoHlthDpt	Robert Hill	517/894-0645	Dow Chemical Mich	517/636-6766	0.00		0
Michigan	Saginaw	08/05	/89	DowChem/SagCoHlthDpt	Don Orth	517/771-0829	Dow Chemical Mich	517/636-6766	0.00		0
Michigan	Allegan County	09/14	/89	County	Bill Hinz	616/673-5411	Drug & Lab	616/685-9824	6082.00		0
Michigan	Allegan County	09/19	/89	County	Bill Hinz	616/673-5411	Drug & Lab	616/685-9824	0.00		0
Michigan	Allegan County	09/21	/89	County	Bill Hinz	616/673-5411	Drug & Lab	616/685-9824	0.00		0
Michigan	Allegan County	09/26	/89	County	Bill Hinz	616/673-5411	Drug & Lab	616/685-9824	2288.00		0
Michigan	Allegan County	09/28	/89	County	Bill Hinz	616/673-5411	Drug & Lab	616/685-9824	4738.00		0
Michigan	Bay City	10/03	/89	DowChem/BayCoHlthDpt	Robert Hill	517/894-0645	Dow Chemical Mich	517/636-6766	0.00		0
Michigan	Saginaw	10/03	/89	DowChem/SagCoHlthDpt	Don Orth	517/771-0829	Dow Chemical Mich	517/636-6766	0.00		0
Michigan	Midland	10/25	/89	Dow /Health Dept.	Doug Dink	517-832-6655	Dow Chemical USA	517-636-6766	0.00		0
Minnesota	Duluth		/88	WLSSD/EPA	Joe Stepan	(218)722-3336			0.00		0
Minnesota	Watonwan County#	04/28	/88	MPCA/County	Larry Palmer	612-297-7082	Aptus: Env.Serv.Inc.	(612)469-3475	0.00	2682 lbs., 126 gal.	25
Minnesota	Ramsey	04/30	/88	City	Donna Portner	(612)296-7039	Aptus	(612)469-3475	4770.00	21 (55) gal drums'	102
Minnesota	Clearwater County	05/07	/88	Cnty	Donna Portner	(612)296-7039	Aptus	(612)469-3475	3710.00	4 (55) gal drums'	39
Minnesota	Moorehead	05/21	/88	Waste Oil Service	Donna Portner	(612)296-7039	Aptus	(612)469-3475	12000.00	6 (55) gal drums'	84
Minnesota	Stevens County (2dy)	05/25	/88	MPCA/County	Larry Palmer	612-297-7082	Aptus; Env.Serv.Inc	(612)469-3475	0.00	3035 lbs, 752 gal	67
Minnesota	McLeod County	06/04	/88	Cnty Fairgrounds	Donna Portner	(612)296-7039	Aptus	(612)469-3475	12000.00	13 (55) gal drums'	239
Minnesota	Morrison County	06/11	/88	Cnty Public Works	Donna Portner	(612)296-7039	Aptus	(612)469-3475	12720.00	10 (55) gal drums'	182
Minnesota	New London'	06/11	/88	Kandiyohi/MPCA	Ned Brooks	(612)296-7352	Aptus	(612)469-3475	0.00		0
Minnesota	Dakota, 4 day/4 site	06/16	/88	Dakota County	George Kinney	(612)450-2793	APTUS	(612)469-3475	0.00		[illegible]
Minnesota	Martin County	06/1[illegible]	/88	Cnty Fairgrounds	Donna Portner	(612)296-7352	Aptus	(612)469-3475	1050[illegible].00	1[illegible](55) gal drum	35[illegible]
Minnesota	Winona County #	06/18	/88	MPCA/County	Larry Palmer	612-297-7082	Aptus; Env.Serv.Inc	(612-469-3475	0.00	12[illegible] lbs, [illegible] gal	1[illegible]
Minnesota	Stevens County	06/25	/88		Donna Portner	(612)296-7352	Aptus	(612)469-3475	4770.00	2(55) gal drums'	44
Minnesota	Clay County #	07/18	/88	MPCA/County	Larry Palmer	612-297-7082	Aptus; Env.Serv.Inc.	(612-469-3475	0.00	573 lbs, 302 gal	17
Minnesota	Two Harbors	07/30	/88	MPCA/Lake Cnty	Ned Brooks	(612)296-6300	APTUS	(612)469-3475	0.00		0
Minnesota	Grand Marais, 2 day	08/13	/88	MPCA/Cook County	Ned Brooks	(612)296-6300	APTUS	(612)469-3475	0.00		0
Minnesota	Goodhue County(2day)	08/17	/88	MPCA/County	Larry Palmer	612-297-7082	Aptus; Env.Serv.Inc.	(612)469-3475	0.00	1370 lbs, 537 gal	67
Minnesota	Cloquet	08/27	/88	MPCA/Carlton Cnty	Ned Brooks	(612)296-6300	APTUS	(612)469-3475	0.00		0
Minnesota	Hennepin Cnty,5 site	09/10	/88	County	Loren Janson	(612)348-8984			0.00		6500
Minnesota	Silver Bay	09/17	/88	MPCA/Lake Cnty	Ned Brooks	(612)569-3475	APTUS	(612)469-3475	0.00		0
Minnesota	Grand Rapids	09/17	/88	MPCA/Itasca Cnty	Donna Portner	(612)296-6300	APTUS	(612)469-3475	0.00		0
Minnesota	West St. Paul	09/17	/88	Dakota Cnty Health	George Kinney	(612)450-2793	CECOS	(613)681-5738	24345.00	46 (55)gal Drums'	700
Minnesota	Barnum	09/24	/88	MPCA/Carlton Cnty	Ned Brooks	(612)296-6300	APTUS	(612)469-3475	0.00		0
Minnesota	Columbia Hts.	09/24	/88	MPCA/City	Donna Portner	(612)296-6300	APTUS	(612)469-3475	232710.00	18(55)gal Drums'	470
Minnesota	Blue Earth	10/01	/88	MPCA/Faribault Cnty	Ned Brooks	(612)296-6300	APTUS	(612)469-3475	131720.00	13(55)gal Drums'	245
Minnesota	Marshall*	10/15	/88	MPCA/Lyon County	Ned Brooks	(612)296-6300	APTUS	(612)469-3475	0.00		0
Minnesota	Mankato	10/15	/88	MPCA/Blue Earth Cnty	Donna Portner	(612)296-6300	APTUS	(612)469-3475	228550.00	24(55)gal Drums'	371
Minnesota	St. Paul*	10/15	/88	Ramsey County	Ray Erickson	(612)633-0316			0.00		0
Minnesota	White Bear Lake	10/15	/88	Ramsey County	Ray Erickson	(612)633-0316			198190.00	22(55)gal Drums'	439
nnesota	Montevideo	10/22	/88	MPCA/Chippewa Cnty	Ned Brooks	(612)296-6300	APTUS	(612)469-3475	0.00		0
sota	St. James	10/2[illegible]	/88	MPCA, Watonwan Cnty	Donna Portner	(612)296-6300	APTUS	(612)469-3475	7101.00	9(55)gal Drums'	14[illegible]
	St. Peter	10/29	/88	MPCA/Nicollet,others	Donna Portner	(612)296-6300	APTUS	(612)469-3475	21[illegible].00	32(55)gal Drums'	456[illegible]
	Marshall '		/89	MPCA/Lyon County	Ned Brooks	(612)296-6300			0.00		[illegible]
	Duluth '		/89	WstLkSupSanDist	Mike [illegible] brooks	218 722 3336			0.00		[illegible]

HOUSEHOLD HAZARDOUS WASTE COLLECTION PROGRAMS BY STATE 1988-1989

STATE	LOCATION	DATE	YEAR	SPONSOR	CONTACT	CPHONE	HAULER	MPHONE	COST	WASTE	PARTICIP
Minnesota	Golden Valley B	02/	/89	Hennepin Cnty DPW	Donald A.Seeberger				0.00	300 lb. of batteries	242
Minnesota	Elk River	04/22	/89	MPCA/SherbourneCo	Donna Portner	612/296-7039	Aptus; Enviro.Servic	612/469-8352	33574.00	38drm/1000ol/1100pnt	599
Minnesota	Shoreview	04/29	/89	Ramsey County	Ray Erickson	612/633-0316	Aptus	612/633-0316	37278.00	2920gals,250carbats	412
Minnesota	Detroit Lakes	04/29	/89	MPCA/Becker Co	Donna Portner	612/296-7039	Aptus	612/469-8352	13680.00	16drm/555oil/275pnt	220
Minnesota	Fergus Falls	04/29	/89	MPCA/Otter Tail Co	Donna Portner	612/296-7039	Aptus	612/469-8352	12090.00	14drm/525oil/330pnt	282
Minnesota	Rice Lake Landfill	04/29	/89	WestLakeSupSanDist	Mike Guite	218/722-3336			0.00		0
Minnesota	West Saint Paul	05/06	/89	Dakota/Ramsey Count.	George Kinney	(612)450-2793	APTUS	612/450-2793	58582.00	38drm/2200ol/2035pnt	937
Minnesota	Rice Lake Landfill	05/06	/89	WestLakeSupSanDist	Mike Guite	218/722-3336			0.00		0
Minnesota	Fergus Falls	05/06	/89	MPCA/Otter Tail Co	Donna Portner	612/296-7039			0.00		0
Minnesota	Rice Lake Landfill	05/13	/89	WestLakeSupSanDist	Mike Guite	218/722-3336			0.00		0
Minnesota	Roseville	05/20	/89	Ramsey County	Ray Erickson	612/633-0316	Aptus	612/469-3475	39386.00	417gals, 20 carbats	430
Minnesota	Rice Lake Landfill	05/20	/89	WestLakeSupSanDist	Mike Guite	218/722-3336			0.00		0
Minnesota	Roseville	05/20	/89	Ramsey Co	Ray Erickson	612/633-0316			0.00		0
Minnesota	statewide collection	05/20	/89	State Ag Dept.	Charles P. Cubbage	517/373-1807			0.00	8500 lbs, 2400 gals	0
Minnesota	Mower County #	05/20	/89	MPCA/County	Larry Palmer	612-297-7082	Aptus; Env.Serv.Inc.	612-469-3475	0.00	1809 lbs, 780 gal	92
Minnesota	Austin	05/26	/89	MPCA/Mower Co	Donna Portner	612/296-7039	Aptus	612/469-8352	35324.00	32drm/1022ol/1320pnt	710
Minnesota	Golden Valley	06/	/89	Hennipin County DPW	Donald A.Seeberger				0.00		403
Minnesota	St.Paul-Hilnd Pk HS	06/03	/89	Ramsey County	Ray Erickson	612/633-0316	Aptus	612/469-3475	43391.00	42drm/1615paint	800
Minnesota	Dist.9,14-16,HilndPk	06/03	/89	Ramsey County	Ray Erickson	612/633-0316			0.00		0
Minnesota	Cottage Grove	06/10	/89	Washington County	Tom Dellenbauch	612-779-5345	APTUS	612-450-2793	24000.00	22drm/935ol/605pnt	560
Minnesota	St.Paul-Unisis Corp.	06/10	/89	Ramsey County	Ray Erickson	612/633-0316	Aptus	612/469-3475	39009.00	42drm/1705paint	630
Minnesota	Two Harbors	06/10	/89	MPCA/Lake Co	Ned Brooks	612/296-7352			0.00		0
Minnesota	Dist.10-13, Unisys	06/10	/89	Ramsey County	Ray Erickson	612/633-0316			0.00		0
Minnesota	St.Paul-Harding HS	06/17	/89	Ramsey County	Ray Erickson	612/633-0316	Aptus	612/469-3475	22666.00	25drm/660paint	350
Minnesota	Waseca	06/17	/89	MPCA/Waseca Co	Donna Portner	612/296-7039	Aptus	612/469-8352	22482.00	24drm/250ol/660pnt	0
Minnesota	District1,4 HardngHS	06/17	/89	Ramsey County	Ray Erickson	612/633-0316	Aptus	612/469-3475	0.00		0
Minnesota	Carlton	06/24	/89	MPCA/CarltonCo	Ned Brooks	612/296-7352	Aptus	612/469-3475	0.00		0
Minnesota	Grand Marais	07/22	/89	MPCA/Cook County	Ned Brooks	612/296-7352	Aptus	612/469-3475	0.00		0
Minnesota	Montevideo	07/22	/89	MPCA/Chippewa Co	Ned Brooks	612/296-7352	Aptus	612/469-3475	0.00		0
Minnesota	Barnum	07/27	/89	MPCA/Carlton Co	Ned Brooks	612/296-7352	Aptus	612/469-3475	0.00		0
Minnesota	Hibbing	08/15	/89	MPCA/StLouisCo	Ned Brooks	612/296-7352	Aptus	612/469-3475	0.00		0
Minnesota	Silver Bay	08/19	/89	MPCA/Lake County	Ned Brooks	612/296-7352	Aptus	612/469-3475	0.00		0
Minnesota	Maplewood	08/26	/89				Aptus	612-469-8387	13200.00	21 drums HHW, etc.	225
Minnesota	Winona *	09/	/89	MPCA/Winona Co	Ned Brooks	612/296-7352	Bay West		0.00		0
Minnesota	Minneapolis (4)(2dy)	09/09	/89	Hennepin County	Scott Albers	612/348-8984	Aptus	612/469-3475	0.00		
Minnesota	Eagan	09/09	/89	Dakota County	George Kinney	612/450-2793	Aptus	612/469-3475	0.00		
Minnesota	Buffalo	09/09	/89	MPCA/Wright Co.	Ned Brooks	612/296-7352	Aptus	612/469-3475	0.00	2 drum HHW etc.	
Minnesota	Hennepin (4)(2dy)	09/15	/89	Hennepin County	Scott Albers	612/348-8984	Aptus	612/469-3475	0.00		
Minnesota	Inver Grove Heights	09/16	/89	Dakota County/BFI	George Kinney	612/450-2793	CECOS	513/681-5738	0.00	1500gl/2700ol/1045pt	572
Minnesota	Mounds View	09/23	/89	Ramsey County	Ray Erickson	612/633-0316	Aptus	612/469-3475	0.00		0
Minnesota	Litchfield	09/23	/89	MPCA/Meeker Co	Mandy Hukriede		Aptus	612/469-3475	0.00	21 drums HHW, etc.	400
Minnesota	New Brighton	09/23	/89				Aptus	612/469-8387	38400.00	33 drums HHW, etc.	695
Minnesota	Virgina	09/30	/89	MPCA/StLouisCo	Donna Portner	612/296-7039			0.00		0
Minnesota	Willmar	09/30	/89	MPCA/Kandiyohi Co	Donna Portner	612/296-7039	Bay West		0.00		0
Minnesota	St. Paul	09/30	/89				Aptus	612/469-8387	13400.00	18 drums HHW, etc.	695
Minnesota	Eagan	10/07	/89	Dakota County	George Kinney	612/450-2793	Aptus	612-469-8387	0.00	31 drums HHW, etc.	750
Minnesota	Lutsen	10/14	/89	MPCA/Cook County	Ned Brooks	612/296-7352	Aptus	612/469-3475	0.00		0
Minnesota	Owatonna	10/14	/89	MPCA/Steele Co.	Ned Brooks	612/296-7352	Aptus	612-469-8387	0.00	11 drums HHW, etc.	0
Minnesota	Hastings	10/14	/89	Dakota County	George Kinney	612/450-2793	Aptus	612/469-8387	0.00	17 drums HHW, etc.	350
Minnesota	Elbow Lake	10/27	/89	MPCA/Grant Co	Donna Portner	612/296-7039	Aptus	612/469-3475	0.00		0
Minnesota	Alexandria	10/28	/89	MPCA/Pope Douglas Co	Donna Portner	612/296-7039	Aptus	612/469-3475	0.00		0
Minnesota	Rochester*	10/28	/89	MPCA/Olmsted Co	Ned Brooks	612/296-7352	Bay West		0.00		0
Mississippi	8 sites #		/89	State	Charles P. Cubbage	517/373-1087			0.00	20,000 containers	0
Missouri	Cape Girardeau	10/01	/88	Dept Nat. Resources	Bruce Martin	(314)751-3176	Petro Chem Services	(314)521-3600	0.00		0
Missouri	50 outlets in 23cnty		/89		Marie Steinwachs	417/836-5777			0.00		0
Nebraska	Lincoln	04/29	/88	Cnty Health Dept	Richard Slama	(402)471-8037	Rollins	(312)260 9470	0.00	16,760 lbs.	
Nebraska	Lincoln *	04/30	/89	Cnty Health Dept	Richard Slama	(402)471 8037	Rollins	(312)260 9470	0.00	120 gal paint	
Nebraska	Lincoln (2 dy)	05/20	/89	Cnty Health Dept	Richard Slama	(402)471 8037	Rollins	(312)260 9470	0.00	[illegible] lb.	
Nebraska	Lincoln	04/11	/89	County Health Dept	Richard Slama	402 471 8037			0.00	[illegible] pound	

HOUSEHOLD HAZARDOUS WASTE COLLECTION PROGRAMS BY STATE 1988-1989

STATE	LOCATION	DATE	YEAR	SPONSOR	CONTACT	CPHONE	HAULER	HPHONE	COST	WASTE	PARTICIP
Nebraska	Lincoln	05/06	/89	County Health Dept	Richard Slama	402-471-8037			0.00	355 pounds	49
Nebraska	Lincoln	06/03	/89	County Health Dept	Richard Slama	402-471-8037			0.00	1871.5 pounds	60
New Hampshire	NH and Vermont B 4	-11/	/88	NH/VT Solid Waste Pr	Connie Leach	603/543-1201			10800.00	9 tons for 1st 1.5 y	0
New Hampshire	Rockingham Cnty-4wks	04/30	/88	City Planning Comm		(603)778-0885	Coating Systems, Inc	(603)883-0553	0.00		0
New Hampshire	Hillsborough	05/07	/88	Nashua Plan. Comm.		(603)883-0366	Coating Systems	(603)883-0553	0.00		0
New Hampshire	Grafton	05/07	/88	Upper Valley Council		(603)448-1680	NE Solvents	(508)683-1002	0.00		0
New Hampshire	Claremont	06/04	/88	MA-VT SWP/Town	Denise Egbert	(603)543-1201	NE Solvents	(508)683-1002	9085.00	22 drums	0
New Hampshire	New London	06/04	/88	NH-VT Sol Wst Proj	Denise Egbert		NE Solvents	(508)683-1002	11235.00	29 drums	0
New Hampshire	Sullivan/Merrimac	06/04	/88	MA-VT SWP/Town	Denise Egbert	(603)543-1201	NE Solvents	(508)683-1002	21828.00	51 drums	126
New Hampshire	Carroll Cnty	06/04	/88	Town		(603)447-3811	Coating Systems	(603)883-0553	0.00		0
New Hampshire	N London/Claremont	06/04	/88	Cnty Reg Refuse Disp			NE Solvents	(508)683-1002	0.00		0
New Hampshire	Meredith	06/11	/88	Reg Plan Comm/2towns	Kim Koulot	(603)379-8171	NE Solvents	(508)683-1002	14925.00	38 drums	0
New Hampshire	Bristol	06/11	/88	Lakes Reg Plan Comm	Kim Koulot	(603)744-2441	NE Solvents	(508)683-1002	14925.00	39 drums	0
New Hampshire	Hillsborough (3)	06/11	/88	Nashua Plan Comm		(603)883-0366	Coating Systems	(603)683-1002	0.00		0
New Hampshire	Belknap	06/11	/88	Lakes Reg Plan Comm		(603)279-8171	NE Solvents	(508)683-1002	0.00		0
New Hampshire	New Boston	09/24	/88	Town	Michael Richards	(603)487-2158	Coatings Systems	603/883-0553	4755.00	445 gals, packaged	45
New Hampshire	Concord	10/01	/88	City	Joseph Musumeci	(603)225-8530	Clean Harbors	(508)655-8863	24274.87	34(55),22(16)galdrms	287
New Hampshire	Gilford	10/01	/88	Lakes Reg Planng.	Cathleen Cavanaugh	(603)524-6284	Clean Harbors	(508)655-8863	12745.00	1085 gals, packaged	196
New Hampshire	Rochester	10/01	/88	Strafford Reg.Planng	Stephen Burns	(603)742-2523			30373.00	4900 gals, packaged	406
New Hampshire	Jaffrey, 2 others	10/22	/88	Ashuelot Valley	Joan Dittrich	(603)363-4320			0.00		0
New Hampshire	Chesterfield, Keene&	10/28	/88	Ashuelot Valley	Wendy Smith	603/357-3875	North East Solvents	508/683-1002	24669.59	54 (55)gal drums	167
New Hampshire	Jaffrey	10/28	/88	Refuse Dispos.Distri	Wendy Smith	603/357-3875	North East Solvents	508/683-1002	0.00	-included w/Keene,Ch	0
New Hampshire	Stratham, 2 others	05/06	/89	Rockingham Plan Comm	Sarah Campbell	603/778-0885	Coatings Systems	603/883-0553	45493.00	10,300 gallons total	850
New Hampshire	Hanover	05/06	/89	Upr Valy HHW Comite	Judy Bowden	603/448-1680	Northeast Solvents	603/448-1680	25926.00	2640gal/100carbat	288
New Hampshire	Exeter, Raymond;	05/13	/89	RockinghamCoPlCom	Sarah Campbell	603/778-0885	Coatings Systems	603/883-0553	0.00	- included w/Stratum	0
New Hampshire	Antrim/Peterborough	05/13	/89	ContoocookVlHHWCom	Dudley Baker	603/924-6127	Clean Harbors, Inc.	603/644-3633	23267.75	3143 gallons	249
New Hampshire	Derry,Salem&Plaistow	05/20	/89	RockinghamCoPlCom	Sarah Campbell	603/778-0885	Coatings Systems	603-883-0553	0.00	-included w/Stratum	0
New Hampshire	Milford	06/03	/89	NashuaRegPlnCom &	Lisa Mausolf	603/883-0366	Coatings Systems	603/883-0553	37994.08	120/55gl,72/5gl drm	536
New Hampshire	New Boston	06/03	/89	Town Conserv Com.	Michael Richard	603/487-2158	Coating Systems Inc.	603/883-0553	3846.00	490 gallons	63
New Hampshire	Meredith, 2 others	06/10	/89	Lakes Reg Plan.Comm.	Kathleen Cavanaugh	603/279-8171	North East Solvents	603/279-8171	31170.00	3160 gallons total	351
New Hampshire	Peterborogh, Atrium	06/10	/89	Contuki Valley	Dudley Baker	603/924-6127	Clean Harbors	603/644-3633	20600.00	various type1437gals	151
New Hampshire	Hudson/Merrimack	06/10	/89	NashRegSWMan/PlnCom	Lisa Mausolf	603/883-0366	Coating Systems Inc.	603/883-0553	0.00	included w/6/3Milfor	0
New Hampshire	New London,Claremont	06/17	/89	NH/VTSWPro/SulivnCo	Denise Edgebert	603/543-1201	North East Solvents	508/683-1002	26000.00	30/55gl, 23/20gl drm	271
New Hampshire	Gilford & Laconia	08/19	/89	LakeRegion Plan Com	Kathleen Cavanaugh	603/279-8171	North East Solvents	508/683-1002	23062.00	2475 gallons	411
New Hampshire	Conway	09/16	/89	Town/Board of Health	Curtis Lunt	603/447-3811	North East Solvents	508/683-1002	8500.00	16 drums	0
New Hampshire	Keene	09/16	/89	AshuelotVlRefDispDis	Wendy Smith	603/357-3875	North East Solvents	508/683-1002	0.00		0
New Hampshire	New Boston	09/23	/89	Town	Michael Richard	603/487-2158	North East Solvents	508/683-1002	0.00		0
New Hampshire	Concord	10/14	/89	Cent NH Reg Plan Dis	Eric Williams	603/796-2129	North East Solvents	508/683-1002	0.00		0
New Hampshire	Dover & Rochester	11/04	/89	StraffordRegPlaCom	Rob Housman	603/742-2523	North East Solvents	508/683-1002	0.00		0
New Hampshire	Merrimack/Nashua	11/04	/89	NashRegPlCom/SWMDist	Lisa Mausolf	603/883-0366	Clean Harbors	603/644-3633	0.00		0
New Hampshire/VT	various NH & VT B	1 - 9	/89	NH/VT Solid Wste Prj	Carl Smith	603/543-1201	GSX		0.00	14 600-800lb drums	0
New Jersey	Hanover	05/14	/88	Morris Sol Wste Mgmt	Larry Gindoff	(201)285-0903	Adv Env Tech Corp	(201)347-7111	25000.00		120
New Jersey	Monmouth	05/14	/88	Health Dept/Cnty	Walt Strausec	(201)431-7456	Radiac	(609)292-8341	55000.00	33,885 lbs	250
New Jersey	Flemington	06/04	/88	Hunterdon Cnty	Theresa Martin	(201)788-1110	Radiac	(609)292-8341	0.00		0
New Jersey	Westfield	10/01	/88	Union Cnty	Joanne Gemondon	(201)527-4216	Radiac	(609)292-8341	0.00	40,000 lbs	310
New Jersey	Tinton	10/08	/88	Monmouth Health Dep	Walt Strausec	(201)431-7466	Radiac	(609)292-8341	46000.00	34,650 lbs	325
New Jersey	Bridgewater	10/22	/88	Somerset Solid Wste	Lisa Gordon	(201)231-7031	Adv Env Tech Corp	(201)347-7111	0.00		0
New Jersey	Westampton Twshp.	10/29	/88	Burlington Cnty	Anne Moore	(609)265-5107	Waste Conversion		0.00		0
New Jersey	Flemington	11/05	/88	Hunterdon Cnty	Theresa Martin	(201)788-1110	Radiac	(609)292-8341	0.00		0
New Jersey	Burleigh	11/12	/88	Cape May Cnty	Tony Moncman	(609)757-6914	Radiac	(718)963-2233	0.00		0
New Jersey	Woodline	11/12	/88	Cape May County	Tony Moncman	609/757-6914	Radiac Research	718/963-2233	38600.00	77(30),40(55)galDrms	91
New Jersey	Cape May County	11/12	/88	Cnty Utilty Authority	Tony Moncman	609/465-8388	Radiac Research Corp	718/963-2233	49232.00	77(30),40(55)gl Drms	93
New Jersey	Lyndonwold	11/19	/88	Camden Solid Waste	Jack Sworaski	(609)757-6914	Radiac	(718)963-2233	0.00		0
New Jersey	Lafayette Twnship	12/10	/88	Sussex County	John Cannata	(201)579-6998			0.00		0
w Jersey	Millersville	04/08	/89		Rich Wascke	301/551-6100	GSX	301/952-4612	0.00		0
Jersey	Tinton Falls	04/15	/89	Monmouth County	Larry Zaayenga	201/431-7460	Radiac	718/963-2233	70000.00	71000 lbs.	485
ey	Somerville	04/29	/89	Somerset County	Diane Vigliante	201/231-7031	Radiac	718/963-2233	0.00	21982	204
	Raritan	05/06	/89	Hunterton County	Theresa Martin	201/785-1110	Radiac Research	718/963-2233	20000.00	65 Drums	150
	Howell	05/06	/89	Monmouth County	Larry Zaavenga	201/431-7460	Radiac	718/963-2233	45000.00	50000 pounds	400

HOUSEHOLD HAZARDOUS WASTE COLLECTION PROGRAMS BY STATE 1988-1989

STATE	LOCATION	DATE	YEAR	SPONSOR	CONTACT	CPHONE	HAULER	HPHONE	COST	WASTE	PARTICIP
New Jersey	Woodline	05/13	/89	Cape May County	Tony Moncman	609/757-6914	Radiac Research	718/963-2233	22900.79	36(55),7(30)gal Drms	62
New Jersey	Lawrence	05/20	/89	Mercer County	Rachel Rosenzweig	609/695-1200	Radiac	718/963-2233	66800.00	74000 pounds	285
New Jersey	Lafayette	06/03	/89	Sussex County	Eleanor Menzonia	201/579-6998	AETC	201/347-7111	0.00	9.5 tons	125
New Jersey	Ocean County	06/03	/89	Ocean County	John Hass	201/929-2054	Stout Environmental	215/822-8995	0.00		0
New Jersey	Ocean County	06/10	/89	County	John Hass	201/929-2054	Stout Environmental	215/822-8995	0.00		0
New Jersey	Hanover,Cnty Garage	06/24	/89	Morris County	Larry Gladoff	201/285-8391	AETC	201/347-7111	35000.00	11000 lbs/140 contan	180
New Jersey	West Hampton	06/24	/89	Rafeal County					0.00		0
New Jersey	Burlington County	06/24	/89	Off Waste Magagement	Robert Simkin	609/499-1001			0.00		350
New Jersey	Somerville	07/22	/89	Somerset County	Diana Vigilante	201/231-7031	Radiac	718/963-2233	0.00		0
New Jersey	Monmouth County	09/16	/89	Monmouth County	Larry Zaanenga	201/431-7460	Radiac	718/963-2233	0.00		0
New Jersey	Camdeb County	09/30	/89	County					0.00		0
New Jersey	Northfield/Atlantic	10/07	/89	Atlantic Co Util Aut	Gary Strich	609/348-3700	Rollins Chem Pack	302-661-7909	106168.25	287drm(15596lbs.pack	154
New Jersey	Monmouth County	10/07	/89	Monmouth County	Larry Zaanenga	201/431-7460	Radiac	718-963-2233	0.00		0
New Jersey	Middlesex County	10/07	/89	County					0.00		0
New Jersey	Burliegh	10/13	/89	Cape May County	Tony Moncman	609/757-6914	Radiac Research	718/963-2233	0.00		0
New Jersey	Raritan	10/14	/89	Hunterton County	Theresa Martin	201-788-1110	Radiac Research	718/963-2233	0.00		0
New Jersey	Somerville	10/14	/89	Somerset County	Diana Vigilante	201/231-7031	Radiac	718/963-2233	0.00		0
New Jersey	Bridgewater Tnshp	10/14	/89	Somerset County	Diana Vigilante	201/231-7031	Radiac	718/963-2233	0.00		0
New Jersey	Cape May County	10/21	/89	County					0.00		0
New Jersey	White Township	10/28	/89	Co Pollu Cntl Fin Au	Mary Briggs	201/453-2174	Radiac Research Corp	718/963-2233	0.00		0
New Jersey	Burlington County	10/28	/89	Off Waste Magagement	Robert Simkin	609/499-1001			0.00		0
New Jersey	Mercer County	10/28	/89	County	Rachel Rosenzweig	609-695-1200	Radiac	718/963-2233	0.00		0
New Jersey	Warren County	10/28	/89	County					0.00		0
New Jersey	Gloucester County	11/04	/89	County	Andrew Raddant	609/863-6661	Radiac&WadeSalvage		24000.00		0
New Jersey	Passaic County	11/04	/89	County					0.00		0
New Jersey	Suffolk	11/04	/89	County					0.00		0
New Mexico	Albuquerque (3dys)	04/29	/89	City & Burlio County	Mile Myers	505/768-2600	Rinchem Co, Inc.	505/345-3655	72000.00	36800 lbs.	676
New Mexico	Albuquerque	07/29	/89	City & Burlio County	Mile Myers	505/768-2600	Rinchem Co, Inc.	505/345-3655	34500.00	17,000 lbs	456
New Mexico	Albuquerque	10/28	/89	City & Burlio County	Mile Myers	505/768-2600	Rinchem Co, Inc.	505/345-3655	33000.00	29,000lbs	636
New York	Southold*		/88	Permanent	Jim Mc Mahon	516/765-1892	Chem Poll Cntrl	(516)586-0333	0.00		0
New York	NY City, 180 stores		/88	Env. Action Coaltion	Timothy Forker	212/677-1601			0.00	900 lbs of batteries	0
New York	Southold B		/88	Town of Southold	Jim McMahon	516/765-1192	Mercury Refining	800-833-3506	0.00		0
New York	North Hempstead	03/26	/88	town	Rhoda Becker	516/627-0590	Chem Poll Cntrl	(516)586-0333	0.00		0
New York	Glen Head	03/26	/88	Oyster Bay	Eric Swanson	(516)921 7374	Chem Poll Cntrl	(516)586-0333	0.00		0
New York	Massapequa	04/16	/88	Oyster Bay		(516)921 7374	Chem Poll Cntrl	(516)586-0333	0.00		0
New York	Roslyn	04/30	/88	N.Hempstead	Rhoda Becker	(516)627 0590	Chem Poll Cntrl	(516)586-0333	0.00		0
New York	Huntington	04/30	/88	Huntington	Janet Dieterich	(516)351-3186	Chem Poll Cntrl	(516)586-0333	0.00		0
New York	Hempstead	06/14	/88	Town of Hemstead	Mr. James Heil	(516)378-4210	CECOS International	(201)248-0600	28000.00	50 drums	180
New York	Riverhead	06/14	/88	Riverhead	Joseph Janowski	(516)727-8194	Chem Poll Cntrl	516/586-0333	0.00		0
New York	Shelter Island	06/14	/88	Shelter Island		(516)749-0291	Chem Poll Cntrl		0.00		0
New York	Syosset	06/21	/88	Oyster Bay	Eric Swanson	(516)921-7374	Chem Poll Cntrl	716/873-4200	0.00		0
New York	Niagra Falls	06/04	/88	City/2 towns/CECOS	David Brooks	(716)286-4400	CECOS		60000.00		160
New York	Setauket	06/11	/88	Brookhaven	John Pavacic	(516)451-6466	Chem Pollu. Control	(516)586-0333	12500.00	36 drums	108
New York	Peekskill	06/11	/88	Westchester Cnty	Carlos Torres	(914)285-5038	Radiac	(718)963-2233	60000.00	68 drums	100
New York	Massapequa	06/18	/88	Oyster Bay	Eric Swanson	(516)921-7347	Chem Pollu. Con.	(516)586-0333	13000.00	43 drums	165
New York	Islip	06/25	/88	Town	Frank Smith	(516)224-5640	Chem Pollu. Control	(516)586-0333	5700.00	20 drums	40
New York	Carle Place	06/25	/88	N. Hempstead	Rhoda Becker	(516)627-0590	Chem Pollu. Control	(516)586-0333	11000.00	37 drums	188
New York	Bayshore	07/16	/88	Town of Islip	Frank Smith	(516)224-5640	Chem Poll. Control	(516)586-0333	9000.00	27 drums	149
New York	Great Neck	07/31	/88	N. Hempstead	Rhoda Becker	(516)627-0590	Chem Pollu. Control	(516)586-0333	10000.00	46 drums	138
New York	Rocky Point	08/13	/88	Brookhaven	John W. Pavacic	(516)451-6455	Chem Pollu. Control	(516)586-0333	10000.00	30 drums	98
New York	Plainview	08/20	/88	Oyster Bay	Eric Swanson	(516)921-7347	Chem Pollu. Control	(516)586-0333	13000.00	54 drums	207
New York	Manhasset/Lakeview	08/27	/88	N. Hempstead	Rhoda Becker	(516)627-0590	Chem Pollu. control	(516)586-0333	10000.00	36 drums	140
New York	Ridge	09/17	/88	Brookhaven	John Pavacic	(516)451-6455	Chem Pollu. Control	(516)586-0333	9500.00	22 drums	70
New York	Erie County #	09/17	/88	Cnty Env. Dept.	Rich Tobe	(716)846-8555	CECOS	(713)873-4200	12000.00	25 drums	248
New York	Holbrook	09/24	/88	Islip	Mr. Bartholomew	(516)224-5640	Chem Pollu. Control	(516)586-0333	7000.00	43 drums	0
New York	New Hyde Park	09/24	/88	N. Hempstead	Rhoda Becker	(516)627-0590	Chem Pollu. Control	(516)586-0333	7630.00	34 drums	229
New York	E. Norwich	09/24	/88	Oyster Bay	Eric Swanson	(516)921-7347	Chem Pollu. Control	(516)586-0333	12000.00	33 drums	131
New York	Riverhead	10/01	/88	Town	Joseph Janowski	(516)727-3200	Chem Pollu. Control	(516)586-0333	0.00	13 drums	13
New York	Rockland County	10/01	/88	Rockland Cnty	Barry Stangel	(914)354-0200	GSX	(800)845-1019	60000.00		430

HOUSEHOLD HAZARDOUS WASTE COLLECTION PROGRAMS BY STATE 1988-1989

STATE	LOCATION	DATE	YEAR	SPONSOR	CONTACT	CPHONE	HAULER	HPHONE	COST	WASTE	PARTICIP
New York	Lindenhurst	10/08	/88	Town of Babylon	Carol Wilder	516/422-7640	Chem Pollu. Control		0.00		0
New York	N. Massapequa	10/15	/88	Oyster Bay	Eric Swenson	(516)921-7347	Chem Pollu. Control	(516)586-0333	0.00		0
New York	Valhalla	10/22	/88	Westchester Cnty	Carlos Tores	(914)285-5038	Advanced Technology	(201)347-7111	0.00		0
New York	N. Babylon	10/22	/88	Town of Babylon	Evan Liblit	(516)422-7640	Chem Pollu. Control	(516)586-0333	0.00		0
New York	Centereach	10/22	/88	Brookhaven	John Pavacic	(516)451-6455	Chem Pollu. Control	(516)586-0333	0.00		0
New York	Hempstead	10/22	/88	Hempstead	Patricia McKendon	516/378-4120	CECOS	201/242-0060	0.00		0
New York	Glen Cove	10/29	/88	City	Anna Iverson	516/676-2000	Chem Pollu. Control	(516)586-0333	0.00		0
New York	Carle Place	10/29	/88	N. Hempstead	Rhoda Becker	(516)627-0590	Chem Pollu. Control	(516)586-0333	0.00		0
New York	Huntington	11/05	/88	Town	Janet Deterich	516/351-3186	Chem Pollu. Control	(516)586-0333	0.00		0
New York	Bay Shore	11/05	/88	Town of Islip	Frank Smith	(516)224-5640	Chem Pollu. Control	(516)586-0333	0.00		0
New York	Smithtown	11/12	/88	Town	Andy Walke	516/269-6600	Chem Pollu. Control	(516)586-0333	0.00		0
New York	Port Washington	11/19	/88	N. Hempstead	Rhoda Becker	(516)627-0590	Chem Pollu. Control	(516)586-0333	0.00		0
New York	Hicksville	11/19	/88	Oyster Bay	Eric Swenson	(516)921-7347	Chem Pollu. Control	(516)586-0333	0.00		0
New York	Southold'		/89	Town	Jim McMahon	516/765-1892	Chem Pollu. Control	(516)586-0333	0.00		0
New York	Southold B		/89	Town of Southold	Mr. Jacobs	516/765-3140	Mercury Refining	800-833-3505	0.00	6(55)gal drms in 6 m	0
New York	Cataragus County B		/89	County DPW	Richard Preston	716-938-9121	Mercury Refining	800-833-3505	0.00		0
New York	Rochester B		/89	Rochester Metro LWV	Alice Young	716/232-3380	Mercury Refining	201/453-2174	0.00	mercury & silver bat	0
New York	Warren County		/89	Pltion Cntrl Fnce Ag	Mary Briggs	201/453-2174	Mercury Refining	201/453-2174	0.00		0
New York	Glen Head	03/18	/89	Oyster Bay	Audrey Buenaventua	516/921-7347	Chem Pollu. Control	(516)586-0333	10000.00	35 Drums	131
New York	New Hyde Park	03/25	/89	North Hempstead	Rhoda Becker	516/627-0590	Chem Pollu. Control	(516)586-0333	14000.00	62 Drums	384
New York	Valhalla	03/30	/89	County	Carlos Torres	914/285-5038	Radiac		30000.00	77Drms(Schools only)	19
New York	Sayville	04/08	/89	Islip	Amy Kutzson	516/224-5646	Chem Pollu. Control	(516)586-0333	0.00	16 Drums	32
New York	Massapequa	04/15	/89	Oyster Bay	Audrey Buenaventura	516/921-7347	Chem Pollu. Control	(516)586-0333	15000.00	97 Drums	568
New York	Huntington	04/22	/89	town	Janet Dieterich	516/351-3186	Chem Pollu. Control	(516)586-0333	20000.00	46 Drums	338
New York	Port Washington	04/29	/89	North Hempstead	Rhoda Becker	516/627-0590	Chem Pollu. Control	(516)586-0333	38000.00	61 Drums	288
New York	Deer Park	05/06	/89	Babylon	Carole Wilder	516/422-7640	Chem Pollu. Control	(516)586-0333	13000.00	38 Drums	158
New York	Hempstead Town Hall	05/06	/89	Hempstead	Patricia McKennon	516/378-4210	CECOS	201/248-0600	380000.00	61 Drums	298
New York	Syosset	05/13	/89	Oyster Bay	Audrey Buenaventura	516/921-7347	Chem Pollu. Control	(516)586-0333	12000.00	65 drums	270
New York	Manhasset	05/20	/89	North Hempstead	Rhoda Becker	516/627-0590	Chem Pollu. Control	(516)586-0333	14000.00	56 drums	283
New York	North Lindenurst	05/20	/89	Babylon(town)	Carole Wilder	516/422-7640	Chem Pollu. Control	(516)586-0333	10000.00	42 drums	149
New York	Cheektowaga	05/20	/89	Erie County	Geri Kotas	716/856-8555	CECOS	716/873-4200	0.00		0
New York	Utica	05/20	/89	Oneida County	Kevin Manion	315/798-5474	GSX Services, Inc.	301/953-9583	165164.99	13265 gallons packed	1100
New York	Rome	05/20	/89	Oneida County	Kevin Manion	315/798-5474	GSX Services, Inc.	301/953-9583	0.00	included w/Utica	0
New York	Herkimer	05/20	/89	Hermiker County	Kevin Manion	315/798-5474	GSX Services, Inc.	301/953-9583	0.00	included w/Utica	0
New York	Glen Cove Fire house	06/03	/89	Glen Cove	Anna Iverson	516/676-2000	Chem Pollu. Control	516/586-0333	125000.00	43 Drums	24[illegible]
New York	Park Golf Course	06/10	/89	Huntington	Janet Dieterich	516/351-3186	Chem Pollu. Control	516/586-0333	0.00		0
New York	Niagra Falls	06/10	/89	Niagra Falls	David Brooks	716/286-4466	CECOS	716/873-4200	15000.00		12[illegible]
New York	Babylon	06/10	/89	Babylon(Village)	Ralph Scondino	516/669-1212	Chem Pollu. Control	516/586-0333	0.00		0
New York	Niagra County	06/10	/89	City-Nia.Flls,Lewis.	David Brooks	716/286-4466	Cecos	800/825-1608	0.00		0
New York	Massapequa	06/17	/89	Oyster Bay	Audrey Buenaventura	516/921-7347	Chem Pollu. Control	516/586-0333	0.00		0
New York	Carle Place	06/24	/89	North Hempstead	Rhoda Becker	516/627-0590	Chem Pollu. Control	516/586-0333	0.00		287
New York	Sea Cliff	07/15	/89	Oyster Bay	Audrey Buenaventura	516/921-7247	Chem Pollu. Control	516/586-0333	0.00		0
New York	Islip	07/22	/89	Town	Julia Hoeldechan	516/224-5640	Chem Pollu Control	516/586-0333	0.00		0
New York	Great Neck	07/30	/89	North Hempstead	Rhoda Becker	516/627-0590	Chem Pollu. Control	516/586-0333	0.00		0
New York	Islip	08/05	/89	Town	Julia Hoeldechan	516/224-5640	Chem Pollu Control	516/586-0333	0.00		0
New York	Brookhaven	08/12	/89	Brookhaven	Sean Walter	516/451-6226	Chem Pollu. Control	516/586-0333	0.00		0
New York	Old Bethpage	08/19	/89	Oyster Bay	Audrey Buenaventura	516/921-7347	Chem Pollu. Control	516/586-0333	0.00		0
New York	Manhasset	08/26	/89	North Hempstead	Rhoda Becker	516/627-0590	Chem Pollu. Control	516/586-0333	0.00		0
New York	Islip	09/09	/89	Town	Julia Hoeldechan	516/224-5640	Chem Pollu Control	516/586-0333	0.00		0
New York	Brookhaven	09/09	/89	Town	Sean Walter	516/451-6226	Chem Pollu Control	516/586-0333	0.00		0
New York	East Norwich	09/16	/89	Oyster Bay	Audrey Buenaventura	516/921-7347	Chem Pollu. Control	516/586-0333	0.00		0
New York	Valhalla	09/16	/89	Westchester County	Carlos Torres	914/285-5038	Radiac	718/963-2233	0.00		0
New York	Hempstead Town Hall	09/23	/89	Hempstead	Patricia McKennon	516/378-4210	Cecos	201/248-0600	0.00		0
New York	New Hyde Park	09/23	/89	North Hempstead	Rhoda Becker	516/627-0540	Chem Pollu. Control	516/586-0333	0.00		0
York	Brookhaven	09/30	/89	Town	Sean Walter	516/451-6226	Chem Pollu Control	516/586-0333	0.00		0
ork	Babylon	10/07	/89	Babylon (town)	Carole Wilder	516/422-7640	Chem Pollu. Control	516/586-0333	0.00		0
	Islip	10/07	/89	Town	Julia Hoeldechan	516/224-5640	Chem Pollu Control	516/586-0333	0.00		0
	North Massapequa	10/14	/89	Oyster Bay	Audrey Buenaventura	516/921-7342	Chem Pollu. Control	516/586-0333	0.00		0
	Hamburg	10/1[illegible]	/89	Erie County	Geri Kotas	716/856-8555	CECOS	716/873-4200	0.00		0

HOUSEHOLD HAZARDOUS WASTE COLLECTION PROGRAMS BY STATE 1988-1989 *

	LOCATION	DATE	YEAR	SPONSOR	CONTACT	CPHONE	HAULER	HPHONE	COST	WASTE	PARTICIP
New York	Huntington	10/21	/89	Huntington	Janet Dieterich	516/351-3186	Chem Pollu. Control	516/586-0333	0.00		0
New York	Babylon	10/21	/89	Babylon(town)	Carole Wilder	516/422-7640	Chem Pollu. Control	516/586-0333	0.00		0
New York	Rochester	10/21	/89	Monroe Co Env Manage	Sue Quarterman	716/428-2126	North East Solvents	508/583-1002	200000.00	152dm/400 30gldm/550	1400
New York	Carle Place	10/28	/89	North Hempstead	Rhoda Becker	516/627-0590	Chem Pollu. Control	516/586-0333	0.00		0
New York	Glen Cove Fire House	10/28	/89	Glen Cove	Anna Iverson	516/676-2000	Chem Pollu. Control	516/586-0333	0.00		0
New York	Pomona	10/29	/89	Rockland County	Diane Greskin	914/354-0200	AETC	201/347-7111	0.00		0
New York	Putnam County	10/28	/89	Putnam County	Ann Bitner	914/225-0310	Radiac	718/963-2233	0.00		0
New York	Brookhaven	11/04	/89	Town	Sean Walter	516/451-6226	Chem Pollu Control	516/586-0333	0.00		0
New York	Hicksville	11/11	/89	Oyster Bay	Audrey Buenaventura	516/921-7347	Chem Pollu. Control	516/586-0333	0.00		0
New York	Port Washington	11/18	/89	North Hempstead	Rhoda Becker	516/629-0590	Chem Pollu. Control	516/586-0333	0.00		0
New York	Syosset	12/16	/89	Oyster Bay	Audrey Buenaventura	516/921-7347	Chem Pollu. Control	516/586-0333	0.00		0
North Carolina	various#		/88	NC Dept of Agricultu	Charles P. Cubbage	517/373-1087			0.00	30,000 lbs	0
North Carolina	various#		/88	NC Dept of Agricultu	Charles P. Cubbage	517/373-1087			0.00	30,000 lbs	0
North Carolina	Raleigh	04/01	/89	City	Cindy Kling	919/890-3400	GSX Services	800/334-5953	0.00		1194
North Carolina	Winston-Salem	10/21	/89		Tom Griffin	919/727-8418	AETC	201/347-7111	0.00	pest/bat/1300ol/80pn	421
North Carolina	Raleigh	10/28	/89	City	Cindy Kling	919/890-3400			0.00	207drm/1800glol/35pn	610
Ohio	Cleveland Heights	04/09	/89		Bob Staise	(216)961-4646	CECOS	(513)681-5779	19625.00	34 drums	276
Ohio	Dayton	11/04	/89	ClarkPro/WHIO TV	Robert Foster	513/268-6501	Clark Processing	513/268-6501	0.00	19tons-oil/paint/bat	550
Oregon	Portland (4)	05/14	/86	Metro Service Dist.	Kathy Thomas	(503)221-1646	Chem Process	(800)354-4336	164317.42	495 drums	1176
Oregon	Lane County	05/21	/86	County	Mike Turner	(503)687-4335	Pegasus	(800)354-9033	0.00		106
Oregon	Portland	10/01	/88	Metro Service Dist.	Rob Smoot	(503)221-1646			0.00		0
Oregon	Portland	04/22	/89	Metro Service Dist	Rob Smoot	503/221-1646	Safety Specialists	408/988-1111	2600000.00	1173(55)galDrms C-88	2500
Oregon	Eugene	06/13	/89	Lane County	Mike Turner	503/687-8743	Chem Processors, Inc	206/835-8743	27000.00	92 Drums	239
Oregon	Portland	10/28	/89	Metro Service Dist	Rob Smoot	503/221-1646	NW Enviro Services	206/622-1090	0.00		0
Pennsylvania	Radnor	05/14	/88	Town	Robert Crawford	(215)688-5600	GSX	(800)845-1019	0.00		0
Pennsylvania	Hatfield	06/11	/88	Town/Wst Conversion	Randy Royer	(215)822-8996	Waste Conversion, Inc	(215)822-8996	0.00	198gl/2889lbs	80
Pennsylvania	York (3 days)	10/06	/88	Cnty Solid Waste Au	Mary Jane Radcliff	(717)845-1066	GSX	(800)845-1019	103000.00	5158gl,6321lbs	769
Pennsylvania	Newtown Square	10/29	/88	ARCO Corp	Jim Borchuk	215/359-2373	GSX	(800)845-1019	0.00		0
Pennsylvania	Buck County	fall	/86	Cty/LWV/Health Dept	John Hadalski	(215)686-7114	Chem Waste Mgmt	(312)396 1050	0.00		0
Pennsylvania	East Norristown	05/06	/89	Montgomery county	Phyliss Lieberman		GSX	301/953-9583	133612.00	11660 gallons packed	1100
Pennsylvania	Springfield	05/13	/89	Montgomery county	Phyliss Lieberman		GSX	301/953-9583	0.00	included w/E.Norriton	0
Pennsylvania	Abington	05/20	/89	Montgomery county	Phyliss Lieberman		GSX	301/953-9583	0.00	included w/E.Norriton	0
Pennsylvania	Radnor	05/20	/89	Town and donations	Cheryl Tumola	215/688-5600	AETC	215/289-3700	53921.00	16,300 lbs	200
Pennsylvania	York(3day)	10/05	/89	York County	Mary Jane Kodkey	717/845-1066	GSX Services, Inc.	301/953-9583	0.00		775
Rhode Island	East Greenwich	05/07	/88	RI DEM	Terrence Gray	(401)277-2797	Clean Harbors	(505)849-1800	40000.00	33d.,42pa.,345c.	3[illegible]
Rhode Island	Providence	05/14	/88	RI DEM	Terrence Gray	(401)277-2797	Clean Harbors	(508)849-1800	6200.00	[illegible]	[illegible]
Rhode Island	Warwick	06/25	/88	DEM/town	Terrence Gray	(401)277-2797	Clean Harbors	(505)655-8863	0.0		[illegible]
Rhode Island	Barrington	09/10	/88	DEM/town	Terrence Gray	(401)277-2797	Clean Harbors	(505)655-8863	0.00		0
Rhode Island	South Kingston	10/15	/88	DEM/town	Terrence Gray	(401)277-2797	Clean Harbors	(508)655-8863	0.00		0
Rhode Island	East Providence	05/06	/89	State	Jeff Crawford	401/277-2797	North East Solvents	508/683-1002	77675.00	245 Drums	0
Rhode Island	Hopkinton	05/20	/89	RI Dept of Envrmnt	Jeff Crawford	401/277-2797	North East Solvents	508/683-1002	25000.00	63 Drums	150
Rhode Island	Cranston	09/09	/89	RI Dept Env Manage	Jeff Crawford	401/277-2797	North East Solvents	508/683-1002	0.00	166 drums	0
Rhode Island	Bristol	09/23	/89	RI Dept of Envrmnt	Jeff Crawford	401/277-2797	North East Solvents	508/683-1002	0.00		0
Rhode Island	Lincoln	10/14	/89	RI DeptEnvManage	Jeff Crawford	401/277-2797	North East Solvents	508/683-1002	0.00		0
South Carolina	Orangeburg	12/07	/88	GSX & Clemson Ext.	Liz McCormack	(800)845-1019	GSX	(800)845-1019	0.00		0
Texas	Austin	04/23	/88	City,Sierra Club	Elizabeth Badger	(512)499-2787	GSX	(800)845-1019	61776.00	167 drums	914
Texas	Deer Park	06/11	/88	Rollins Env Services	Marshall Smith	(713)479-6001	Rollins	(713)479-6001	0.00		0
Texas	Jefferson 4wk x (3)	10/	/88	County	Scott Nicholson		Chem Waste Mgmt	(409)736-2821	0.00		0
Texas	Orange 4wk x (3)	10/	/88	County	Scott Nicholson		Chem Waste Mgmt	(409)736-2821	0.00		0
Texas	Texas City,Galveston	10/08	/88	Union Carbide/City	Robert O'Brian	(409)948-5226	Chem Waste Mgmt	404/952/0444	0.00	65(30)gal Drums	200
Texas	Brazoria Co. 4 sites	03/11	/89	Dow Chemical	Marliese Goold	409/238-2805	Dow Chemical	409/238-2805	9241.00	10,000 pounds	151
Texas	Austin, 3 sites	04/22	/89	City of Austin	Ingrid Dierlam	512/499-2834	GSX	800/251-1227	98823.00	261Drums,3400galOil·	1267
Vermont	Windsor/Windham	06/04	/88	NH-VT Sol Wst Proj	Denise Egbert	(603)543-1201	NE Solvents	(508)683-1002	0.00	see NH	0
Vermont	Brattleboro	08/27	/88	Wyndham Waste Dist.	Paul Lorence	(802)257-0272	NE Solvents	(508)683-1002	11900.00		0
Vermont	Hanover, Rt. 120	05/06	/89	Upper Valley HHW Com	Judy Bowduin	603/448-1680	North East Solvents	508/683-1002	23000.00	46(55)galDrums,100CB	236
Vermont	Brattleboro	06/19	/89	Windham Cnty SWM Dst	Steve Johnson	802/257-0272	North East Solvents	508/683-1002	15300.00	32 drums	1
Vermont	Montpelier	09/22	/89	Centrl VT Reg Plng C	Michael Bender	802/229-0389			8976.92	1500gl 750gal fuel	50
Vermont	Springfield	09/30	/89	NH/VT Solid Was Proj	Carl Herth	603/543-1201	North East Solvents	508/583-1002	11423.00	25 drum	1
Vermont	#	12/16	/89	Cntrl VT Plng Counci	Barb Winters	802/244-7831			0.00	[illegible]	[illegible]

HOUSEHOLD HAZARDOUS WASTE COLLECTION PROGRAMS BY STATE 1988-1989

STATE	LOCATION	DATE	YEAR	SPONSOR	CONTACT	CPHONE	HAULER	HPHONE	COST	WASTE	PARTICIP
Virginia	Arlington Cnty*		/88	County	Cynthia Hilton	(202)659-4613 .			0.00		0
Virginia	Loudoun (2 wk)	04/09	/88	County	Rick Pedeschi	(703)777-0234	GSX	(800)638-4440	36000.00	11,872 lbs	169
Virginia	Fairfax Cnty,2day	05/07	/88	County Fire Dept	Melanie Pearson	(703)246-2331	Rollins Env	(302)479-2700	40000.00	10,000 lbs	200
Virginia	Alexandria	05/07	/88	Dept TES	Dick Croxford	(703)838-4488	GSX		0.00		0
Virginia	Fairfax County	05/21	/88	County Fire Dept	Melanie Pearson	(703)246-2331	Rollins Env Service	(302)479-2700	98000.00	36,00 lbs	850
Virginia	Chesterfield	10/	/88	Chest. Extens.Servic	Susan Craik	804/751-4401	GSX	804/751-4401	19570.00	41(55)gallon Drums	237
Virginia	Chesapeake	10/08	/88		Liz McCormack	(800)845-1019	GSX	(800)845-1019	0.00		0
Virginia	Virginia Beach	10/08	/88	SE Public Serv. Auth		(804)420-4700	GSX	(800)845-1019	0.00		0
Virginia	Prince William Cnty	10/15	/88	County	Lynne Fass	(703)335-7326	GSX	(800)845-1019	0.00		0
Virginia	Smithfield	10/22	/88	SE Pub. Serv. Author		(804)420-4700	GSX	(800)845-1019	0.00		0
Virginia	Frfax/Towtr/Cnst	10/29	/88	Cnty Fire Dept	Sandra Morse	(804)225 2667	Rollins Env Service	(302)479-2700	0.00		0
Virginia	Fairfax Cnty	11/05	/88	County Fire Dept	Melanie Pearson	(703)246-2331	Rollins Env Service	(302)479-2700	0.00		0
Virginia	Alexandria	11/05	/88	County	Liz McCormack	(800)845-1019	GSX	(800)845-1019	0.00		0
Virginia	4 counties (2 dy)	fall/	/88		Jennifer Ladd	(804)420-4700			0.00		0
Virginia	Montgomery Cnty	fall/	/88	County			GSX	(800)638-4440	0.00		0
Virginia	Arlington *		/89	Cnty Water Pol Cntl	Dennis Wisler	703/358-6832	Ecoflow		42500.00	300 gal/600 lbs	0
Virginia	Manchester HS	04/01	/89	Chesterfield County	Susan Craik	804-751-4401	GSX	903/798-2993	63400.00	900gal Oi..,160(55)D	355
Virginia	Carver Middle School	04/15	/89	Chesterfield County	Susan Craik	804-751-4401	GSX	903/798-2993	0.00	incl w/Manchester HS	0
Virginia	Alexandria	05/06	/89	City	Dick Croxford	703/836-4433	GSX	301/953-9583	35980.00	3690 gal. packed	420
Virginia	Chesapeake	05/13	/89	SE Public Service Au	Jennifer Ladd	804/420-4700	GSX	301/953-2933	0.00		280
Virginia	Suffolk	05/20	/89	SE Public Service Au	Jennifer Ladd	804/420-4700	GSX	903/798-2993	0.00		67
Virginia	Manassas/Prince Wil.	09/16	/89	Prince William Cnty	Lynn Fass	703/335-7326	GSX	803/798-2993	0.00		100
Virginia	Reidsville	10/21	/89	SEnrPubServAuthorVir	Jennifer Ladd	804/420-4700	GSX	803/798-2993	0.00		0
Virginia	Chesepeake*	10/28	/89	SE Pub. Serv. Author	Jennifer Ladd	804/420-4700			0.00		0
Washington	Whatcom Cnty*		/88	Health Dist	Dave Bader	(206)676-6724			0.00		0
Washington	Thurston Cnty*		/88		Marie Zarofke	(206)786-5457			0.00		0
Washington	King County*		/89	Chem Processors	Glen Dillman	(206)762-3362	Chem Processors	(206)762-3362	0.00		0
Washington	King County*(5)		/88	County Health Dept	Stephanie Whitman	(206)587-3292			0.00		0
Washington	3 counties		/88		Charles Cubbage	517/373-1087			0.00	25 tons	0
Washington	Yakima 3 wks x (3)	03/	/88	DPW	Mark Nedrow	(509)595-4126			0.00		0
Washington	Thurston	05/21	/88	Cnty Health Dept	Marie Zarofke	(206)786-5457	Chem Processors	(206)223-0500	0.00		0
Washington	King County(4sites,2	06/03	/88	City/County/Metro	Richard Conlin	(206)382-5013	ChemPro/NWEnviroServ	206 223-0500	425776.00	1732drums(250tons)	[illegible]
Washington	Spokane	06/04	/88	Health Dept	Rys Sterling	(509)456-6040	Chem-Safe Services	(509)965-3973	0.00		0
Washington	Yakima Co 8	08/26	/88	State Dept of Agri	Lee Faulkner				0.00	21.85 tons	12
Washington	Washougal	09	/88	Chem Processors Inc		(206)223-0500	Chem Processors Inc	206 223-0500	0.00		0
Washington	Pacific Co 7	09/00	/89	State Dept of Agr.	Lee Faulkner				0.00	counties w Yakima Co	
Washington	Whatcom Co 8	09/00	/89	State Dept of Agri	Lee Faulkner				0.00	counties w Yakima Co	
Washington	4 counties (5)	09/24	/88	Hood Canal Coord Cou	Richard Conlin	(206)382-5013	ChemPro/NWEnviroServ	206-223-0500	101000.00	251 drums (35tons)	115
Washington	Seatle* beg	10/	/88	City Solid Waste	Chriss Luboff	206/684-7144	NW Enviro Services	206/622-1090	0.00		0
Washington	King County (4)	10/22	/88	City/KingCo/Metro	Richard Conlin	(206)382-5013	Chem Pro	206-223-0500	240589.00	653 drums (104 tons)	3150
Washington	Clark County	Fall/	/88						0.00		0
Washington	Thurston County*		/89	County	Marie Zaroske	206/786-5459	Chem Pro	206/223-0500	0.00		0
Washington	Georgetown* 8		/89	Chem Processors,Inc.	Mal Williams	206/223-0600	Chem Pro	206/223-0500	0.00		0
Washington	Washougal* 8		/89	Chem Processors,Inc.	Mal Williams	206/223-0600	Chem Pro	206/223-0500	0.00		0
Washington	Seattle/King 5 site*		/89	City Solid Waste	Wallace Swefford	206/296-4633	NW Enviro Service		0.00		0
Washington	Whatcom County*		/89	County/City	Dave Bader	206/676-6724			0.00		0
Washington	Spokane (City) *		/89	County Health Dept	ennis Hein	509/456-2600	Chem Safe		0.00		0
Washington	Seattle/Shilshole *		/89	Port of Seattle	Max Stevens	206/728-3000	NW Enviro Service		0.00		0
Washington	King County *)		/89		Henry Draper	206/296-4404	Chem Pro	206/223-0600	0.00		0
Washington	Bellevue		/89	City Solid Waste	Geoff Ethelson	206/455-6964	NW Enviro Service	206/622-1090	0.00		0
Washington	King County *		/89		Chris Luboff	206/684-7644	NW Enviro Services	206/622-1090	0.00		0
Washington	Seatle*		/89	City Solid Waste	Chriss Luboff	206/684-7144	NW Enviro Services	206/622 1090	0.00		0
Washington	Bellington B	/88-	/89	Thermal Reduction Co	Lisa Schnebele	206/384-1057	Thermal Reduction Co	206/384-1057	0.00	800 lb. of batteries	0
Washington	Yakima County	03/11	/89	County Solid Waste	Mark Nedrow	509/575-4076	Chem Pro	206/223-0500	0.00		0
Washington	Yakima County	03/18	/89	County Solid Waste	Mark Nedrow	509/575-4076	Chem Pro	206/223-0500	0.00		0
Washington	Yakima County	03/25	/89	County Solid Waste	Mark Nedrow	509/575-4076	Chem Pro	206/223 0500	0.00		0
Washington	Benton/Franklin Cnty	04/22	/89	Benton/Franklin Co.	Max Rigby	509/943 9185	Chem Pro	206 223-0500	40000.00		[illegible]
Washington	Cowlit. County	05 1	/89	County Solid Waste	Don Olson	206/577 3030	Chem Pro		0.00	74 drum	[illegible]

HOUSEHOLD HAZARDOUS WASTE COLLECTION PROGRAMS BY STATE 1988-1989

	LOCATION	DATE	YEAR	SPONSOR	CONTACT	CPHONE	HAULER	HPHONE	COST	WASTE	PARTICIP
Washington	Everett	06/03	/89	Snohomish County	Jack Wolfin	206/259-9425	NW Enviro Service	206-622-1090	65350.00	336 Drums	975
Washington	Spokane (City)	06/03	/89	Solid Waste Dept	Dennis Hein	509/456-2600	Chem Pro	206/223-0500	60000.00	90 drums	2500
Washington	Jefferson County	06/10	/89	County Health Dept	Cynthia Howarth	206/385-0722	Chem Pro	206/223-0500	8200.00	18 drums	60
Washington	Yakima County	06/10	/89	County Solid Waste	Mark Nedrow	509/575-4076	Chem Pro	206/223-0500	0.00		0
Washington	Yakima County	06/17	/89	County Solid Waste	Mark Nedrow	509/575-4076	Chem Pro	206/223-0500	0.00		0
Washington	Yakima County	06/24	/89	County Solid Waste	Mark Nedrow	509/575-4076	Chem Pro	206/223-0500	0.00		0
Washington	San Juan Co (3)	09/09	/89	San J. Co Health Dep	Helen Winters	206/378-3421	Chem Pro	206/223-0500	0.00	82 drums	0
Washington	Tacoma/Pierce County	09/23	/89	City Public Works	Dave Frutiger	206/591-5543	Chem Safe	509/968-3973	40000.00	56LabPk/750glol/25bl	575
Washington	King Co (6) began *)	09/28	/89	King Co., SW Div.	Henry Draper	206/296-4044	Chem Pro	206/262-2362	0.00		0
Washington	Marysvl/Snohomish #	10/12	/89	State Dept of Agri	Lee Faulkner	206/753-5064			0.00	80+lab packs	37
Washington	Clark County	10/14	/89	County Health Dist	Sally Toteff	206/459-6303	Chem Pro	206/262-2362	0.00	82 drums	302
Washington	Yakima County	10/14	/89	County Solid Waste	Mark Nedrow	509/575-4076	Chem Pro	206/223-0500	0.00		0
Washington	Skagit County	10/21	/89	Co Public Works	Bill Ness	206/336-9400	NW Enviro Service	206/622-1090	0.00		0
Washington	Yakima County	10/21	/89	County Solid Waste	Mark Nedrow	509/575-4076	Chem Pro	206/223-0500	0.00		0
Washington	Pullman #	10/25	/89	State Dept of Agri	Lee Faulkner	206/753-5064			0.00	130 labpacks	43
Washington	Yakima County	10/28	/89	County Solid Waste	Mark Nedrow	509/575-4076	Chem Pro	206/223-0500	0.00		0
Washington	Clark County	10/29	/89	County Health	Gary Bickett	206/695-9215			0.00		0
Washington	various locations#	11/	/89	state	Charles Cubbage	517/373-1807			0.00		0
Washington	3 counties	sprin	/89		Charles Cubbage	517/373-1087			0.00	89 tons	36
Wisconsin	Outagamie Cnty	04/30	/88		Steve Golebic	(414)735-5148			0.00		0
Wisconsin	Alleghany	04/30	/89	Cnty	Dave Munsch	(414)735-5119			0.00		0
Wisconsin	Kenosha	05/20	/88	City	George Zimmer	(414)656-8170			0.00		0
Wisconsin	Racine	06/18	/88	Health Dept	Robert Bagley	(414)636-9493			0.00		0
Wisconsin	Madison	09/	/88	Health Dept	Jill Schmidt	(608)266-4843			0.00		0
Wisconsin	Madison	09/	/88		Dennis Sopcich	(414)266-4029			0.00		0
Wisconsin	Sheboygan Cnty	10/02	/88	County	Liz McCormack	(800)845-1019	GSX	(800)845-1019	0.00		0
Wisconsin	Hudson	04/29	/89	St. Croix County	Ellen Denzer	715/386-4673	GSX	414/321-7200	47560.00	3170 gallons packed	570
Wisconsin	Ellsworth	04/29	/89	Pierce County	Ellen Denzer	715/386-4673	GSX	414/321-7200	0.00	included w. Hudson	0
Wisconsin	Whitewater	05/06	/89	City, DNR grant	Dean Fischer	414/473-7336	GSX	414/321-7200	16685.12	1505 gallons packed	65
Wisconsin	Waukesha	05/06	/89	Waukesha	Karen Fiedler	414/548-7790	Chem Waste Mngmnt	312/396-1050	0.00		395
Wisconsin	Manaqua(fire station	05/13	/89	Anita Cnty DNR	George Haydursko	715/369-6130	GSX	414/321-7200	35000.00		16
Wisconsin	Depere Fairgrounds	05/13	/89	BrownCo.Sld.Wst.Auty	John Whitcomb	414/436-3264	Aque Tek	414/284-5746	26000.00	13000 pounds	236
Wisconsin	Wausau, Marathon Pk	05/18	/89	Marathon County	Jim Pelliterri	715/847-5258	GSX	414/321-7200	0.00	113 barrels	337
Wisconsin	Wapacka	05/20	/89	County SWM Board	Tom Wilson	715/258-7681	GSX	414/321-7200	21000.00	33 barrels	65
Wisconsin	Manawa	05/20	/89	Marathon,Oneida Cnty	Tom Wilson	715/258-7681	GSX	414/321-7200	21000.00	33 barrels	65
Wisconsin	Madison,Cnty Hwy Gr.	05/27	/89	City, Dane County	Dennis Sopcich	715/266-4029	GSX	414/321-7200	64000.00	125(55)gallon drums	70
Wisconsin	Altoona	05/30	/89	Eau Claire County			GSX	803/79[illegible] 299[illegible]	0.00	4[illegible] drums	0
Wisconsin	Berlin	10/07	/89	City Emergency Serv	Gary U. Podoll	414/361-4584	Chem Waste Managemnt		0.00		0
Wisconsin	Manitowac	10/14	/89	Manitowac Co PubWks	Jeffrey Beyer	414/683-4085			0.00		0
Wisconsin	Marinette/Wausaukee	10/21	/89	MarinetteCo/UWExtn	John Lefebvre	715/735-3371	GSX	800/845-1019	0.00		0
Wyoming	Casper	08/26	/89	K. N. Energy, Colora	Larry Courte	303/989-1740	GSX	803/798-2993	0.00	90 drums	0
									19821589.21		260453

Source: Dana Duxbury & Associates, January 1990

Appendix VI

National Household Hazardous Waste Collection Program Survey

NATIONAL HOUSEHOLD HAZARDOUS WASTE COLLECTION PROGRAM SURVEY
PART A

1. Location(s) and date(s) collection program was or will be held.

____

____

2. Type of program: (please check all that apply)

__HHW only
__Single day
__Single site
__Permanent*
__Oil only
__Paint only
__Pesticide only
__HHW & Conditionally Exempt
__Multiple days
__Multiple sites
__HHW recyclables only
__Dry cell battery only
__Part of curbside recycling
__School labs only

Other (please specify) ______________________________

* A permanent program is defined as one which is held at a fixed site with frequent, regular collection times (at least 1/month).

3. Sponsor: ______________________________

Address: ______________________________

City: ______________ State: __________ Zipcode: ________

Contact Person: ______________________ Phone: __________

4. Hazardous Waste Contractor: ______________________

Address: ______________________________

City: ______________ State: __________ Zipcode: ________

Contact Person: ______________________ Phone: __________

5. Cost of the program: Waste Management $______________

Publicity/education $____________; Staffing $____________

Other operating expenses $________; Total costs $____________

6. Total amount of waste collected (please specify what units were used (e.g., 55-gal. drums, pounds, tons, gals., etc.) and whether it was packaged weight or raw weight): ______________________

____

7. Number of households __________ or carloads ____________

PLEASE RETURN TO DANA DUXBURY & ASSOCIATES, 16 HAVERHILL STREET, ANDOVER, MA, 01810, Phone (508) 470-3044, Fax (508) 475-2136.

Appendix VII

Permanent HHWM Program Managers; map of states with permanent programs, chart of their growth

PERMANENT HHWM PROGRAM MANAGERS

December 1989

Lindalee Anderson
Environmental Specialist
Volusia County Envirn Control Mgmnt
123 W Indiana Ave
DeLand, FL 32720-4621
904-736-5927

Dave Bader
Whatcomb County Health Department
P.O. Box 935
Bellingham, WA 98227
206-676-6724

George Berry
Sturbridge Board of Health
Sturbridge Town Hall
Sturbridge, MA 01566
508-347-2504

Ned Brooks
Pollution Control Specialist
MPCA - Hazardous Waste Division
520 Lafayette Road, North
St. Paul, MN 55155
612-296-7352

Mary Catherwood
Environmental Consultant
Kandiyohi County
711 Southeast 4th Street
Willmar, MN 56201
612-235-9678

Robert Ceru
Chief, Special Programs
Ingham County Health Department
P.O. Box 30161
Lansing, MI 48909
517-887-6988

Thomas M. Dewhirst
Household Haz. Waste Coordinator
Kalamazoo Co. Environmental Health
418 W. Kalamazoo Avenue
Kalamazoo, MI 49007
616-384-8004

Henry Draper
King County Solid Waste Division
King County Administration Building
500 4th Avenue
Seattle, WA 98104
206-296-4404

Donna Engstrom
Kent County Department of Public Works
1500 Scribner, N.W.
Grand Rapids, MI 49504
(616)774-6892

Mike Guite
Western Lake Superior Sanitary Dist.
27th Avenue West and the Waterfront
Duluth, MN 55802
218-722-3666

Janelle Henderson
Manager of HHW
Larimer County
PO Box 1190
Ft. Collins, CO 80522
303-221-7712

Joseph E. Johnson
SF Solid Waste Program Manager
City and County of San Francisco
271 City Hall
San Francisco, CA 94102
415-554-6187

Brian Johnson
Toxic Chemical Coordinator
City of Santa Monica
1685 Main Street
Santa Monica, CA 90401-3295
213-458-8228

Neil Jones
Regional Waste Management District
Monterey County
PO Box 609
Marina, CA 93933
408-384-5313

Al Kakovich
Chemical Processors, Inc.
625 South 32nd Street
Washougal, WA 98671
206-223-0500

Bill Kryger
Program Manager, Solid Waste Dept
Municipality of Anchorage
P.O. Box 196650
Anchorage, AK 99519-6650
907-561-1906

Jennifer Ladd
Haz Waste Admin
Southeastern Public Service Authority
16 Kroger Executive Center - 101
Norfolk, VA 23502
804-420-4700

Stephen Manville
HHW Coordinator
Washtenaw County Health Dept.
P.O. Box 8645
Ann Arbor, MI 48107-8645
313-994-2457

Judy Orttung
Supervising Env Health Specialist
San Bernardino Co. Env Health Services
385 North Arrowhead Avenue
San Bernardino, CA 92415
714-387-4629

Tanya Spano
Process Control Engineer
Water Pollution Control Plant
3401 S. Glebe Rd.
Arlington, VA 22202
703-684-6607

Wallace Swofford
Environmental Health Supervisor
Seattle-King Co Dept of Public Health
172 20th Avenue
Seattle, WA 98122
206-296-4633

David Walter
Olmsted Co Public Works Dept
2122 Campus Dr SE
Rochester, MN 55904
507-285-8231

Dennis Wilser
Arlington Co Water Poll
3401 So Glebe Rd
Arlington, VA 22202-2398
703-358-6820

Marie Zuroske
Environmental Health Specialist
County Health Department
W2000 Lakeridge Drive
Olympia, WA 98502
206-786-5459

Robert MacDonald
Enviornmental Health Planner
Macomb County Health Dep't
43525 Elizabeth Rd
Mt. Clemens, MI 48043
313-469-5236

Jim McMahon
Southold Town Hall
Main Road
Southold, NY 11971
516-765-1892

Russell Smith
Program Coordinator
Martha's Vineyard Refuse Disp. Dist.
P.O. box 2248
Oak Bluffs, MA 02887
508-698-3479

Larry Sweetser
Environmental Compliance Program Mgr
Norcal Solid Waste Systems, Inc.
5 Thomas Mellon Circle, Suite 266
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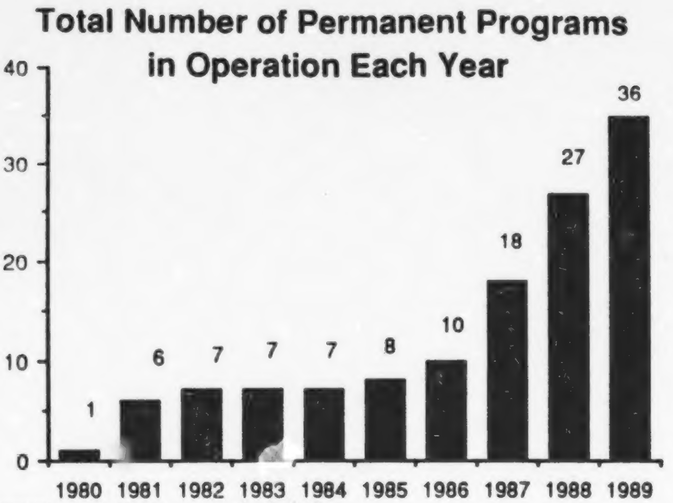
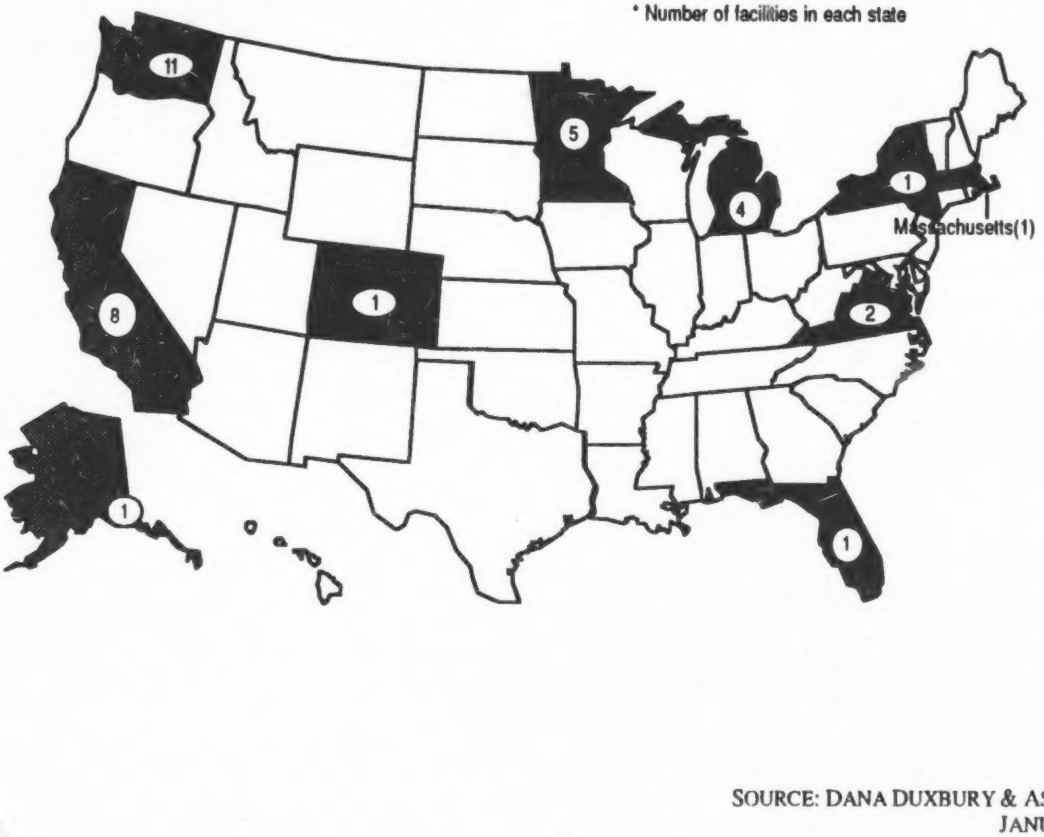

Total Number of Permanent Programs in Operation Each Year

*Discontinued programs are included only during the years they operated

States ■ in Which Permanent HHW Facilities Are Located *



SOURCE: DANA DUXBURY & ASSOCIATES
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Bill Sinclair
State Bureau of Hazardous Waste
Tooele County Courthouse
47 South Main
Tooele, UT 84074
801-538-6170

Jeff Throckmorton
Salt Lake City County Health Dept.
610 South Second East
Salt Lake City, UT 84111
801-534-4519

VIRGINIA

Robin Bain
Engineer III, Waste Water Treatment
Dept. of Public Works, Fairfax County
3930 Pender Drive
Fairfax, VA 22030
703-691-2281

David Conn
Associate Director
Univ. Cntr. for Env. & Haz. Mat. Stud.
VA Polytechnic Institute & State Univ.
Blacksburg, VA 24061-0113
703-961-7508

Suzan E. Craik
Extension Agent
Chesterfield County Extension Service
P.O. Box 146
Chesterfield, VA 23832
804-751-4401

VERMONT

Connie Leach
Chief, Recycling and Resource Section
VT DEC, Waste Management Division
103 South Main Street
Waterbury, VT 05676
802-244-7831

Barbara E. Winters
Recycling-Res Rec Specialist
VT Agency of Environmental Conserv'n
103 S Main St W Bldg
Waterbury, VT 05676
802-244-7831

WASHINGTON

Richard Conlin
Projects Director
Metrocenter YMCA
909 Fourth Avenue
Seattle, WA 98104
206-382-5013

Paige Denslow
Environmentalist I
Washington Deptartment of Ecology
4224 6th Avenue SE Bldg 4
Lacey, WA 98503
206-459-6312

WASHINGTON (cont'd)

Henry Draper
King County Solid Waste Division
King County Administration
500 4th Avenue
Seattle, WA 98104
206-296-4404

David Galvin
Water Quality Planner
Seattle METRO Water Resources, MS-81
821 2nd Avenue, Exchange Bldg.
Seattle, WA 98104
206-684-1216

William P. Green
Solid and Hazardous Waste Program
WA Department of Ecology
Mailstop PV-11
Olympia, WA 98504-8711
206-438-7233

Chris Luboff
Environmental Analyst
City of Seattle, Solid Waste Utility
710 Second Ave, 505 Dexter Horton Bldg
Seattle, WA 98104
206-684-7644

Sally Toteff
HHW/SQG Project Development
WA Department of Ecology
Mailstop PV-11
Olympia, WA 98504-8711
206-459-6303

WISCONSIN

Elaine Andrews
UWEX
1450 Linden Drive, Room 216
Madison, WI 53706
608-262-0142

Colleen Hilenbrand
Bureau of Solid Waste Mgmt. Haz. Waste
Department of Natural Resources
101 S. Webster St., GEF II, Box 7921
Madison, WI 53707-7921
608-267-7561

Eric Syftestad
Bureau of Solid Waste Mgmt. Haz. Waste
Department of Natural Resources
101 S. Webster St., GEF II, Box 7921
Madison, WI 53707-7921
608-267-7561

WEST VIRGINIA

H. Michael Dorsey
Env Analyst, Generator Asst. Program
Division of Waste Management, DNR
1800 Washington Street, East
Charleston, WV 25303
304-348-5935

Appendix X

Collection Program Contractors

COLLECTION PROGRAM CONTRACTORS

A/C Industrial Cleaning Co.
177 East 15th Street
Chico, CA 95928
(916) 343-5488

APTUS
21750 Cedar Avenue
Lakeville, MN 55041
(612) 469-3475

Advanced Environmental Technology Corp
Gold Mine Road
Flanders, NJ 07836
(201) 347-7111

American Environmental Management
11292 Western Avenue. P.O. Box 125
Stanton, CA 90680
(714) 826-6320

Appropriate Technologies II
1700 Maxwell Road
Chula Vista, CA 92011
(619) 421-1175

Aquatech Laboratories
140 South Park Street
Port Washington, WI 52074
(414) 284-5746

Bay Area Environmental
1125 Hensley Street
Richmond, CA 94804
(415) 233-8001

CECOS
2321 Kenmore Avenue
Buffalo, NY 14207
(716) 873-4200

Chem-Safe Services, Inc.
P.O. Box 616
Kittitas, WA 98934
(509) 968-3973

Chemical Pollution Control
120 South 4th Street
Bay Shore, Long Island, NY 11706
(516) 586-0333

Chemical Processors
2203 Airport Way South
Seattle, WA 98134
(206) 223-0500

Chemical Waste Management, Inc.
4300 W. 123rd Street
Alsip, IL 60658
(312) 296-1920

Chemical Waste Management, Inc.
39899 Balentine Dr., Suite 320
Newark,, CA 94560
(415) 651-2964

Chemical Waste Management, Inc.
100 Nassau Park Blvd.
Princeton, NJ 08540
(609) 243-7800

Chemical Waste Management, Inc.
156 Weymouth St., NE Service Center
Rockland, MA 02370
(800) 843-7110

Chemical Waste Management, Inc.
2600 Delk Road, Suite 100
Marietta, GA 30067
(404) 952-0444

Clean Harbors
325 Wood Road
Braintree, MA 02184
(617) 849-1800

Coating Systems
55 Crown Street
Nashua, NH 03060
(603) 883-0553

Source: Dana Duxbury & Associates
January 1990

Crosby and Overton
1610 West 17th Street
Long Beach, CA 90813
(213) 432-5447

Disposal Control Service
1369 West Ninth Street
Upland, CA 91786
(714) 981 0998

Drug and Laboratory Disposal, Inc.
331 Broad Street
Plainwell, MI 49080
(616) 685-9824

E & K Hazardous Waste Services
2905 Paine Avenue
Sheboygan, WI 53081
(414) 458-6030

Ecoflo, Incorporated
8520 M Corrider Road
Savage, MD 20763
(301) 498-4550

Environmental Management, Inc.
P.O. Box 3940
Edmond, OK 73083-3940
(405) 348 5080

Environmental Systems Company
333 Executive Court
Little Rock, AR 72205
(501) 223-4100

Findley Chemical Disposal
10720 Redwood Avenue
Fontana, CA 92335
(714) 823 3939

GSX Chemical Services, Inc.
P.O. Box 210799
Columbia, SC 29221
(800) 845-1019

Heritage Remediation/Engineering
1175 Western Drive
Indianapolis, IN 46241
(317) 243 0811

Heritage Remediation/Engineering
183 McDonall Boulevard
St. Louis, MO 63042
(314) 521-3600

Inland Pollution Control
156 Weymouth Street
Rockland, MA 02370
(617) 843-7110

International Technology Corporation
23456 Hawthorne Blvd.
Torrance, CA 90505
(213) 378-9933

McDonald and Watson
Pole 12 Green Hill Road
Johnston, RI 02919
(401) 946 0200

Mercury Refining Company, Inc.
790 Watervliet-Shaker Rd.
Latham, NY 12110
(800) 833-3505

N.E.I. Resource Services
P.O. Box 550, 21400 Hamburg Avenue
Lakeville, MN 55044
(612) 469-3475

New Eng. Marine Contractors, Inc.
13 Dorset Lane
Williston, VT 05495
(802) 879-8800

Norcal Solid Waste Systems, Inc.
501 Tunnel Avenue
San Francisco, CA 94134
(415) 568 4114

North East Solvents
221 Sutton Street
North Andover, MA 01845
(508) 683-1002

North State Environmental
P.O. Box 5624
South San Francisco, CA 94083
(415) 588-2338

Northwest EnviroServices
1700 Airport Way, South
Seattle, WA 98134
(206) 622-1090

Oakland Scavenger Company
2601 Peralta Street
Oakland, CA 94607
(415) 465-2911

Pegasus Waste Management, Inc.
P.O. Box 1871
Lake Oswego, OR 97034
(800) 354-9033

Radiac Research
259 Kent Avenue
Brooklyn, NY 11211
(718) 963-2233

Rinchen Co.
6133 Edith Blvd, NE
Albuquerque, NM 87107
(505) 345-3655

Rollins Environmental Srvcs. (FS) Inc.
P.O. Box 2349
Wilmington, DE 19899
(302) 479-2700

SET
450 Sumac Road
Wheeling, IL 60090
(312) 537-9221

Safety Specialists
P.O. Box 3060
Santa Clara, CA 95054
(408) 988-1111

Samsel Services Co.
1948 Carter Road
Cleveland, OH 44113
(216) 861-3949

Sanitary Fill Company
501 Tunnel Avenue
San Francisco, CA 94134
(415) 468-2442

Stout Environmental
2869 Sandstone
Hatfield, PA 19440
(215) 822-8995

John McQuillan
Triumvirate Environmental, Inc.
80 Independence Ave
Quincy, MA 02169
(617) 328-9282

U.S. Pollution Control, Inc.
2000 Classen Center, Suite 400 South
Oklahoma City, OK 73106
(405) 528-8371

Unitek Environmental Services, Inc.
2889 Mokumoa Street
Honolulu, HI 96819
(808) 834-1444

Vallejo Garbage Service
P.O. Box 3157
Vallejo, CA 94590
(707) 552-3110

Zero Waste Systems, Inc.
2928 Poplar
Oakland, CA 94608
(415) 893-8257

Appendix XI

City of Santa Clara model HHW collection RFP

Attachment A

Household Hazardous Waste Collection Program
(One Day Drop-off Event)
Model Specification

Handling of chemical wastes from households, when done properly, can be done safely and in environmentally protective ways. When done improperly, the chemicals can cause harm to individuals during the collection program, or harm to the environment during transportation or subsequent processing, disposal or reuse. The superfund sites identified since implementation of the superfund program include many businesses that acted as recyclers, treaters or disposers.

Care in developing program specifications and in making decisions about the program can minimize the chances of subsequent problems. This model household collection specification as a service to local governments. It divides consideration into two general categories: technical and cost. Decision makers can review the technical proposal first to assure that a prospective contractor meets the kind of specifications that will protect the public health, safety and the environment. After settling on those contractors which meet these specifications, the decision makers can then move on to cost considerations. The cost specifications provide clear pricing units so that contractor comparisons can be made on an "apples to apples" basis.

This format can be used as an insert in your next Request for Proposal.

As a guideline for comparison, we have demonstrated that this program assumes the temporary site is open to the public a total of 5 hours on one day and each staff person works a total of 9 hours, with an estimated generation of 50 drums of lab packed material. Batteries, paints and waste oils are listed as separate items and separate quantities and are structured so that the Contractor can propose different handling options.

With this format you will be able to compare apples to apples. When you are in the final phases of choosing the contractor based on the information provided in your request for proposal, you can ask for more specific information and pricing.

This attached sample Request for Proposal was prepared with input, assistance, and cooperation between local government and the hazardous waste disposal industry.

Chemical Waste Management, Inc.
Technical Services Division
Tonie Santos
Household Project Development

(415) 770-0575

City of Santa Clara
Public Works Department
William Alexander
Street Sanitation Supervisor
(408) 984-3080

Attachment B

PROPOSAL SUBMISSION

The following describes the information which must be furnished as part of the proposal and the format in which it must be presented.

FORMAT:

Proposals shall be submitted in two distinctly severable parts consisting of the following volumes:

Volume I. Proposal Certifications and Price Schedule

Volume II. Technical Proposal

Evaluation criteria for Technical Acceptability

Technical proposals submitted will be evaluated in accordance with the criteria checked in paragraph below. All of the checked criteria are of equal importance. An offer will not be technically acceptable unless it is determined to be technically acceptable for all of the checked criteria. If a proposal contains a significant deficiency for a checked criteria it will not be considered technically acceptable for that criteria. A deficiency is defined as that part of an offeror's proposal which would not satisfy the requirements of this proposal.

___ Acceptability of Treatment/Disposal/Recycling plan submittal.

___ Acceptability of Transporter EPA Number submittal.

___ Acceptability of Safety Procedures submittal.

___ Technical Information submittal.

___ Acceptability of Insurance requirements.

HOUSEHOLD HAZARDOUS WASTE COLLECTION DAY

COST PROPOSAL

I. Proposal Certification and Price Schedule

A. Set up costs Lump Sum $_____

Set up costs are defined as those pertaining to Contractor's crew mobilizing to the site, setting up the site for the collection day, all appurtenances, equipment and materials performing services for a total of 9 hours (Breakdown: 1 hour set-up, 5 hours collection, 2 hours packaging, and 1 hour tear down) which includes clean up and demobilization from the site. All hours worked in excess of 8 hours (on the day of the collection event) and any additional time required to packaging, will be charged at the rates outlined below. The City will be responsible for providing traffic control and disposal containers of non-hazardous wastes generated by the event.

B. Personnel

	Per Hour Straight Time	Per Hour Overtime
(1) Chemist	$______	$______
(1) Project Manager	$______	$______
(6) Technicians	$______	$______

( ) Estimated or suggested numbers

Comments:

____
____
____
____

Per Diem $_____/per day

C. Event site and permits

Contractor shall assist city in making arrangements regarding site including necessary permits for the event. City shall receive copies of all permits, description of arrangements and any agreements.

D. Disposal

	Each	Total
1. Battery Recycling	$______	$_____

(List method and Disposal/Treatment Facility Here)

____
____
____
____

Each Total

2. Motor Oil for Recycling
(Est. 150 gallon drums) $______/gallon $_____

(List method, recycling facility and any additional costs for handling empty containers here.)

Each Total

3. Latex Paint for Recycling:
(Est. 100 gallons) $______/gallon $_____

(List method and Disposal/Treatment Facility Here)

Each Total

4. **Latex Paint if landfilled**
(Est. 100 gallons)
Lab Pack (5 drum equivalent) $______/drum $_____

(List method and Disposal/Treatment Facility Here)

Each Total

5. **Oil Based Paint for Recycling**
(Est. 150 gallons) $______ $_____

(List method and Disposal/Treatment Facility Here)

__Storage__ - if any items are to be stored prior to treatment/disposal. List facility name, address, and I.D. No. here.

____
____
____
____

__Services__

	Each
* Lab Pack if __landfill__ (per drum, each size)	
55-gallon	$______
30-gallon	$______
5-gallon	$______

__(List method and Disposal/Treatment Facility Here)__

____
____
____
____

6. Oil Based Paint for __landfill__
(Est. 150 gallons)

Lab Pack $______/drum

__(List Disposal/Treatment Facility Here)__

____
____
____
____

	Each
* Lab pack for __incineration__ (non-reactive)	
30-gallon	$______
14-gallon	$______
5-gallon	$______

__(List Disposal/Treatment Facility Here)__

____
____
____
____

	Each
E. __Testing__: Unknown/Unlabeled/Generic	$______

F. Transportation:

Transportation costs will vary according to the amount of drums generated and the distance to be traveled to the final destination.

$______ per truck (1 to 40 drums)
$______ per truck (41 to 75 drums)

(List Transporter Name, Location and Permit Number Here)

____
____
____
____

$______ per loaded mile (for comparison).

List alternative handling/treatment/disposal options for the following and the associated costs.

Latex Paint: ______________________ $______
____

Oil Based Paint: ______________________ $______
____

Batteries: ______________________ $______
____

Waste Oil: ______________________ $______
____

G. Optional methods of cost proposal (agency option to consider to modify previous Sections D, E, F)

Although it is more difficult for the contractor to predict, not knowing how many drums will be generated, with this structured format, you may want an additional total combined cost for transportation/disposal, and supplies for each type of management method listed for easier comparison.

Example:

Lab Pack Landfill (Kettleman City, CA) $______ per 55-gallon

$______ per 30-gallon
$______ per 5-gallon

(Includes supplies, transportation and disposal)

Incineration (List facility) $______ per 30-gallon

$______ per 5-gallon

* Contractor shall only use licensed TSD's for treatment and/or disposal of waste materials. Request contractor to specify which disposal/treatment facility is to be used for each type of material listed.

Note: For other special unit costs for unanticipated but potenti services or quantities, include list of rates and charges

II. TECHNICAL PROPOSAL

(a) The following documentation shall be provided along with the proposal. Such documentation shall be considered in determining the technical acceptability of the offeror's proposal.

1) OPERATIONS PLAN This plan shall include a description of how operations will be handled for the collection day, including a site drawing showing placement of safety equipment, traffic control and areas for receiving, packaging, handling, transporting and disposing of materials received.

The operations plan shall also include an EMERGENCY spill plan. It shall encompass all steps the contractor will take in the event of a spill or other emergency.

The operations plan shall include procedures regarding handling and testing of unknown or unlabeled materials as well as handling restricted items which may be received at the collection event.

MANAGEMENT OPTIONS

Include a brief description of all recycling, reuse and treatment options which may be utilized including names, locations and permit numbers of ultimate facilities.

Contractor shall only use licensed TSD's for treatment and/or disposal of waste materials. Where contractor proposes to reclaim or reuse materials, contractor shall clearly specify the manner in which materials will be reclaimed or reused. Proposals to reuse shall clearly specify that materials will not be stored longer than 90 days prior to reuse and shall clearly describe the facilities to be used for storage, including plans for inspection and spill or leaking container response. Contractor shall describe audits it has carried out prior to making selections of all subcontractor facilities that are proposed to receive waste.

TRANSPORTATION

For each transporter used, the Contractor shall provide all applicable state hauling permit numbers with this proposal.

PERSONNEL

The plan will also include a listing of equipment and personnel as well as their job duties, to be used on this project. Team leaders, other supervisors and team members shall be specified by name and copies of their professional profiles shall be included in this proposal.

Contractor shall only utilize personnel that have completed the required 40 hours OSHA training and who have received additional training regarding spill response, containment, evacuation techniques and who receive ongoing training in the hazardous materials handling industry.

2) EXPERIENCE Shall include:

i) The length and type of experience of the individuals identified in personnel.

ii) The locations, contact names, and a brief description of services for which prior comparable services have been rendered by the contractor.

3) SAFETY

The contractor must perform all operations in a prudent, conscientious, safe and professional manner. At a minimum, Contractor's personnel and equipment shall comply with applicable state, federal, local and installation laws, safety regulations and procedures and contractor will ensure that its agents, employees, and subcontractors perform in a safe manner. The Contractor shall ensure that all personnel involved in handling and packaging the hazardous waste be trained for the level of expertise required for the proper performance of the task and, in particular in the areas of chemical incompatibility, general first aid procedures and spills as required by OSHA. Contractor must indicate that its personnel or subcontractors used in the handling of hazardous waste have completed this 40 hour training requirement.

4) AGREEMENT TO PROVIDE SERVICES

Contractor to enter into agreement to provide services.

AGREEMENT BETWEEN THE CITY OF ___________
AND
____
FOR THE COLLECTION AND DISPOSAL OF
HOUSEHOLD HAZARDOUS WASTES

THIS AGREEMENT (herein "Agreement") is made and entered into this _____ DAY of ________________, 19__, by and between the City of __________, a __________(State) municipal corporation, (herein "CITY") and ______________________, a __________(State) corporation, (herein "CONTRACTOR") for the purpose of providing household hazardous waste collection services to the residents of the City of __________. CITY and CONTRACTOR are collectively referred to herein as the "Parties to this Agreement".

The Parties to this Agreement hereby agree as follows:

RECITALS

A. CONTRACTOR has specialized skills and experience in the area of hazardous waste collection and disposal which qualifies it to conduct a household hazardous materials collection program.

B. CITY requested that the CONTRACTOR prepare a program to provide for household hazardous waste collection services to occupants of residential properties in the City of Santa Clara.

C. CONTRACTOR has provided to CITY a proposal for a program which would provide specialized hazardous waste collection services, including the collection and disposal of household hazardous materials for the residents of the City of Santa Clara.

D. CITY and CONTRACTOR desire to specify in this Agreement the terms and conditions under which the above referenced program can be initiated and carried out by the CONTRACTOR.

AGREEMENT PROVISIONS

In consideration of the above recitals and the following mutual covenants, agreements and obligations, The Parties to this Agreement further agree as follows:

1. EMPLOYMENT OF CONTRACTOR

CITY hereby employs CONTRACTOR to provide the required services as described in paragraph 2 of this Agreement. CITY agrees to pay CONTRACTOR for such services in accordance with the provisions of paragraph 4 hereof.

2. DESCRIPTION OF SERVICES TO BE PROVIDED

In consideration for the compensation set forth in this Agreement, CONTRACTOR, agrees to perform work and services to successfully complete a one (1) day residential hazardous waste disposal event as described in EXHIBIT "A" entitled "______________________ ______________________," including the terms included in the proposal submitted ________________, attached hereto and incorporated herein by reference.

3. COMMENCEMENT OF WORK

CONTRACTOR shall commence preparation for performance under the requirements of this Agreement as soon as possible after the effective date of this Agreement and shall complete said work by providing the required household hazardous waste collection and disposal services within ninety (90) days after the collection event.

4. COMPENSATION FOR SERVICES PERFORMED

In full consideration for CONTRACTOR'S performance of the services described in EXHIBIT "A", the CITY shall be obligated to pay CONTRACTOR according to the fee rates and at the times provided for and specified in same EXHIBIT "A". Any increase in such fee rates shall not be effected unless confirmed by prior written approval of the CITY.

5. CONSULTANT'S AUTHORIZATION

The execution of this Agreement shall constitute CONTRACTOR'S authority to proceed with the necessary preparations for the collection and disposal services described in this Agreement.

6. DEFAULT OF CONTRACTOR

If CONTRACTOR or its subcontractor fail to perform any of the services and provide any of the materials which CITY has arranged to be performed specified in the terms and conditions of this Agreement within the time and in the manner set forth herein or otherwise violate any of the terms of this Agreement, CITY may terminate this Agreement by giving CONTRACTOR seven (7) day written notice of termination, stating the reason for such termination. nI such event, CONTRACTOR shall be entitled to rectify problem or receive as full payment for all actual labor and materials satisfactorily rendered, provided, however, that there shall be deducted from such amount of damage, if any, sustained by CITY by virtue of the breach of this Agreement by CONTRACTOR.

7. ASSIGNMENTS AND SUCCESSORS IN INTEREST

A. This Agreement is binding on CONTRACTOR, its successors and assigns. Except as set forth in the Agreement, neither CITY nor CONTRACTOR shall assign, sublet, or transfer any of its interest in this Agreement, in whole or in part, without the written consent of the other. Any assignment by CONTRACTOR without the prior written consent of the CITY violates this Agreement and gives the

CITY the right to terminate this Agreement. Any assignment does not relieve CONTRACTOR of its obligations under this Agreement.

B. Except as set forth in this Agreement, CONTRACTOR shall not engage subcontractors or consultants to carry out the responsibilities undertaken pursuant to this Agreement without the written consent of the CITY.

C. All assignees, subcontractors, or consultants approved by the CITY shall be subject to the same terms and conditions applicable to CONTRACTOR under this Agreement.

D. All approved agreement(s) between CONTRACTOR and subcontractor and/or assignee for services pursuant to this Agreement shall be in writing and a confirmed copy of such agreement(s) shall be provided to CITY.

8. CONTRACTOR IS NOT EMPLOYEE OF CITY

CONTRACTOR, in performing the work required under this Agreement, is an independent contractor and is not an employee of CITY. All persons employed by or contracted with CONTRACTOR to furnish labor and/or materials in connection with the work under this Agreement are not employees of CITY. It is expressly understood and agreed that no agency, employee, partnership, joint venture or other relationship is established by the Agreement.

9. RIGHT OF CITY TO INSPECT RECORDS OF CONTRACTORS

A. CONTRACTOR agrees to maintain sufficient books and records in accordance with generally accepted accounting principles to establish the correctness of all charges submitted to CITY. Any expenses not so recorded shall be disallowed by CITY.

B. CITY, through its authorized employees, representatives, or agents, shall have the right, during the term of this Agreement and for four (4) years from the termination date of this Agreement, to examine and audit all the books, records, and related documents of CONTRACTOR for the purpose of verifying any and all charges made by CONTRACTOR in connection with CONTRACTOR compensation under this Agreement to allow CITY to determine compliance with relevant federal, state and local laws and regulations and to evaluate the quality, appropriateness and timeliness of the services provided under this Agreement.

C. CONTRACTOR agrees to keep such records in its possession and assure the maintenance of such records by all assignees, subcontractors or other third party performing work under this Agreement for a period of four (4) years from the termination date of this Agreement or until audit findings are resolved, whichever is later.

10. PERFORMANCE OF WORK

CONTRACTOR shall perform any labor and provide any materials required under this Agreement in an efficient and expeditious manner and shall keep the CITY informed regarding the details of the collection program.

11. TERM OF AGREEMENT

Unless otherwise modified by an amendment to this Agreement, the term of this Agreement shall commence on the effective date of this Agreement, as first set forth above, and shall terminate on ________________________, or when all the obligations under this Agreement have been satisfied, whichever is later.

12. QUALIFICATIONS OF CONTRACTOR - STANDARD OF WORKMANSHIP

CONTRACTOR represents that its personnel are qualified to furnish services in the form of labor and materials of the type and quality which CITY requires and that CONTRACTOR agrees to performs all work in accordance with generally accepted business practices and performance standards of the industry.

13. HOLD HARMLESS/INDEMNIFICATION

To the extent permitted by law, CONTRACTOR agrees to protect, defend, hold harmless and indemnify, and agrees to protect, defend and hold harmless against all claims, suits, injury, liability, loss, cost and expense or damage, however same may be caused including all costs and reasonable attorney's fees in providing a defense to any claim arising therefrom for which CONTRACTOR shall become legally liable, arising from CONTRACTOR'S negligent acts, errors, or omissions with respect to or in any way connected with the performance of the work by CONTRACTOR pursuant to this Agreement. CONTRACTOR also specifically agrees to pay for all attorney's fees, court costs and other costs of defending CITY against any suit or claim arising from any activities connected with the performance of work by CONTRACTOR pursuant to this Agreement. CITY agrees to mutually indemnify contractor from same.

14. NONDISCRIMINATION

CONTRACTOR shall comply with the nondiscrimination requirements set forth in EXHIBIT "B" and attachments thereto. EXHIBIT "B" is attached hereto and incorporated herein by reference.

15. INSURANCE REQUIREMENTS

A. CONTRACTOR shall maintain policies in effect with respect to persons, employees and vehicles assigned to the performance of work under this Agreement throughout the term of this Agreement:

1. Comprehensive general liability policy (personal injury, bodily injury and property damage).

2. Worker's compensation employer's liability policy, and

3. Comprehensive automobile liability insurance.

B. Such policies shall be maintained with the required coverage amounts and providing the required endorsements, certificates of insurance and coverage verifications as required and set forth in EXHIBIT "C", attached hereto and incorporated herein by reference.

16. PROTECTION AND SECURITY OF WORK

The data and information and reports acquired or prepared by CONTRACTOR shall not be shown or distributed to any other public or private person or entity except as authorized by CITY, and in no event prior to having been first disclosed to CITY.

17. AMENDMENTS

This Agreement is complete and contains all the terms and conditions agreed upon by the Parties. It is mutually understood and agreed that no alteration or variation of the terms of this Agreement shall be valid unless made in writing and signed by the parties hereto and no oral understanding or agreement shall be binding on the parties to this Agreement.

18. CHANGES

CITY or CONTRACTOR may, from time to time, request changes in the terms and conditions of this Agreement. Such changes, which are mutually agreed upon by and between CITY AND CONTRACTOR, shall be incorporated in written amendments to this Agreement.

19. NOTICES

All notices to the parties hereto shall, unless otherwise requested in writing, be sent to CITY addressed as follows:

____
____
____

And to CONTRACTOR addressed as follows:

____
____
____

20. __________(State) LAW TO GOVERN

It is understood and agreed by the Parties to this Agreement that this Agreement shall be deemed and construed to be entered into and performed in the State of __________(State). The validity of this Agreement, its terms and conditions, as well as all rights and duties of the Parties to this Agreement and interpretation and performance of the obligations contained herein, shall be governed by the laws of the State of __________(State).

21. COMPLIANCE WITH APPLICABLE LAWS

All services to be performed by CONTRACTOR pursuant to this Agreement shall be performed in accordance with all applicable federal, state, county and municipal laws, ordinances, regulations, provisions pertaining to confidentiality of records, and applicable quality assurance regulations, especially those laws, ordinances and regulations regarding the collection, transportation and storage of hazardous materials and hazardous wastes.

(6)

THE PARTIES TO THIS AGREEMENT hereby indicate their acknowledgement and acceptance of the terms and conditions stated herein as evidenced by the following signatures of their duly authorized representatives. It is the intent of the parties that this Agreement shall be effective as of the day and year first indicated above.

APPROVED AS TO FORM:	CITY OF __________"City"
____________________________	By: ____________________________
City Attorney	Mayor
ATTEST:	
	By: ____________________________
____________________________	City Manager
City Clerk	
	Address:
	Telephone:
	"CONTRACTOR"
	(Name of Company) ______________________
	By: ____________________________ (Name) (Title)
	Local Address:
	____________________________
	____________________________
	Telephone: ( ) ____________

(7)

AGREEMENT BETWEEN THE CITY OF __________
AND
____
FOR THE COLLECTION AND DISPOSAL OF
HOUSEHOLD HAZARDOUS WASTES

EXHIBIT B

A. No person shall, on the ground of race, color, national orgin, religious affiliation or non-affiliation, sex, age, handicap, or political affiliation, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under this Agreement.

B. CONTRACTOR shall insure equal employment opportunity based on objective standards of recruitment, selection, promotion, classification, compensation, performance evaluations, and management relations, for all employees under this Agreement. CONTRACTOR'S personnel policies shall be made available to CITY upon request.

C. CONTRACTOR shall assure compliance with Section 504 of the Rehabilitation Act of 1973 by submitting a signed letter of assurance (Attachment 1) of compliance, CONTRACTOR shall be prepared to submit a self-evaluation and compliance plan to the CITY upon request with one (1) year of the execution of this Agreement.

EXHIBIT "B"

AGREEMENT BETWEEN THE CITY OF ___________
AND
____
FOR THE COLLECTION AND DISPOSAL OF
HOUSEHOLD HAZARDOUS WASTES

EXHIBIT C

Insurance Requirements for Contractor.

A. CONTRACTOR, at its sole cost and expense and for the full term of this Agreement or any renewal thereof, shall provide and maintain not less than the following minimum insurance coverage and limits of insurance which shall be maintained with insurers and under forms of policies satisfactory to the CITY.

(1) An EXTENDED BOARD FORM MINIMUM COMPREHENSIVE GENERAL LIABILITY INSURANCE POLICY covering Bodily Injury and Property Damage with a combined single limit of at least One Million Dollars ($1,000,000) per occurrence providing the following coverages.

(a) Premises Operations

(b) Independent Contractors

(c) Contractual Liability (for liability of others assumed by the Subcontractor in the contract between the Subcontractor and the Contractor)

(2) A WORKERS' COMPENSATION AND EMPLOYERS LIABILITY POLICY (if required by State law) written in accordance with the laws of the State of _________ and providing the following coverages for any and all employees of CONTRACTOR:

(a) Statutory Workers' Compensation Coverage A (statutory limit)

(b) Employers' Liability Insurance - Coverage B. Not less than:
100,000 each accident/BI $500,000 policy limit
100,000 each employee

EXHIBIT "C"

AGREEMENT BETWEEN THE CITY OF __________
AND
____
FOR THE COLLECTION AND DISPOSAL OF
HOUSEHOLD HAZARDOUS WASTES

EXHIBIT C cont.

(3) A COMPREHENSIVE AUTOMOBILE POLICY with a minimum combined single limit of not less than One Million Dollars ($1,000,000) for bodily injury and property damage, applicable to vehicles used in pursuit of any of the activities associated with this Agreement and providing the following coverages (without deductibles):

(a) All owned vehicles

(b) Employer's Non-ownership Liability

(c) Hired Automobiles

(4) ENDORSEMENTS. All of the following clauses and endorsements, or similar provisions, _______ required to be made a part of each of the above required policies:

(a) A "Cross Liability" or "Severability of Interest" clause; and

(b) This policy shall be considered primary insurance as respects to any other valid and collectible insurance the CITY may possess, including any self-insured retention the CITY may have, and any other insurance the CITY does possess shall be considered excess insurance only; and

(c) NO CANCELLATION OR NON-RENEWAL OF THIS POLICY OR MODIFICATION OF THE COVERAGE AFFORDED UNDER THIS ENDORSEMENT SHALL BE EFFECTIVE UNTIL WRITTEN NOTICE HAS BEEN GIVEN AT LEAST THIRTY (30) DAYS PRIOR TO THE EFFECTIVE DATE OF SUCH MODIFICATION OR CANCELLATION TO THE CITY.

Notice shall be sent to:

City: ______________________

Attention: _________________

Address: ___________________

EXHIBIT "C"

AGREEMENT BETWEEN THE CITY OF ____________
AND

____
FOR THE COLLECTION AND DISPOSAL OF
HOUSEHOLD HAZARDOUS WASTES

EXHIBIT C cont.

B. PROOF OF INSURANCE COVERAGE AND COVERAGE VERIFICATION. A copy of the Certificate of Insurance and completed coverage verification shall be provided to CITY by each of the CONSULTANT'S insurance companies as evidence of the stipulated coverages within ten (10) days of the effective date of this Agreement. The Certificate(s) of Insurance and coverage verification shall be mailed to:

____

____

____

EXHIBIT "C"

Appendix XII

DD&A Publications Order Form

Dana Duxbury & Associates

16 Haverhill Street, Andover, MA 01810
(508) 470-3044 Fax: (508) 475-2136

The following information is available from our office to support your efforts in managing household hazardous waste in your community. Our price reflects the cost of xeroxing, postage and handling.

	PRICE	QUANTITY
☐ "**Bibliography on Household Hazardous Wastes**" *Prepared by Dana Duxbury & Associates, 1989*	*$5.00*	
☐ "**National Listing of Household Hazardous Waste Collection Programs 1980-87**" *Compiled by Dana Duxbury & Associates, 1989*	*$2.50*	
☐ "**National Listing of Household Hazardous Waste Collection Programs 1988-89**" *Compiled by Dana Duxbury & Associates, 1989*	*$3.00*	
☐ "**National HHW Management Expert List**" *Compiled by Dana Duxbury & Associates, 1989*	*$ .75*	
☐ "**State HHW Management Expert List**" *Compiled by Dana Duxbury & Associates, 1989*	*$2.00*	
☐ "**Collection Program Contractors**" *Compiled by Dana Duxbury & Associates, 1989*	*$1.00*	
☐ "**Permanent Household Hazardous Waste Management Programs Operating in 1989**" *Compiled by Dana Duxbury & Associates, 1989*	*$2.50*	
☐ "**Permanent HHWM Program Managers**" *Compiled by Dana Duxbury & Associates, 1989*	*$1.00*	
☐ "**Proceedings of 4th National HHWM Conference**" *Published by Dana Duxbury & Associates, Available February 1990.*	*$30.00*	
	TOTAL	

PLEASE MAKE CHECK PAYABLE TO: **DANA DUXBURY & ASSOCIATES.** *THANK YOU.*

NAME____

ORGANIZATION__________________________________

ADDRESS______________________________________

____

PHONE____

___ **I would like to receive the quarterly newsletter HOUSEHOLD HAZARDOUS WASTE MANAGEMENT NEWS.**

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Appendix XIII

HHWM IV Conference Audio Tape Order Form

GRCDA

P.O. BOX 6126
Silver Spring, MD 20906

U.S. ENVIRONMENTAL PROTECTION AGENCY HOUSEHOLD HAZARDOUS WASTE MANAGEMENT CONFERENCE

NOVEMBER 6-8, 1989 • ORLANDO, FLORIDA

Audio Cassette Order Form

General Session Speakers

__ Tape 1 Keynote Address • Jeffery Denit, U.S. EPA, DC
A Federal Legislative Update • Gerri Dorian, U.S.Congress Committee Staff, DC
__ Tape 2 HHW '81 - '89 • Dana Duxbury, DD&A, MA
Why HHWM is Needed • David Galvin, Seattle Metro, WA
News From Rubbish Sorts • William Rathje, University of Arizona, AZ
__ Tape 3 Integrating HHWM with Solid Waste Management
Developing a Comprehensive HHWM Program • David Galvin, Seattle Metro, WA
Source Reduction Overview • Michael Flynn, U.S. EPA
__ Tape 4 S/R as a Component of Integrated Waste Management • Martha Burke, City of Seattle, WA
Survey of Commercial Substitutes • Phillip Dickey WA Toxics Coalition, WA
Reformulation • The Process • Carl Richie, Dow Chemical, MI; William Chase, CSMA, DC
__ Tape 5 Developing a State-Mandated Planning Process • Bill Green, Dept. of Ecology,WA
California Waste Management Board's Program • Caren Trgovcich, CWMB, CA
__ Tape 6 Senator George Kirkpatrick • Florida State Senator • Luncheon Speaker
__ Tape 7 Maximizing Participation • David Galvin, Seattle Metro, WA; Dana Duxbury, DD&A, MA
Closing Remarks • Robert Dellinger, U.S. EPA, DC

CONCURRENT SESSIONS

__ Tape 8 HOW-TO/PLANNING (Planning; Facility/Site Operations; Health & Safety; Training)
__ Tape 9 USED OIL (Technical Aspects - Re-Refining, Reclaiming); State Programs; Education
__ Tape 10 PESTDICIDES (U.S. EPA's Activities; Collection Programs; Biological Controls)
__ Tape 11 HOW-TO/WASTE MANAGEMENT (Regulatory Issues; Problem/Priority Wastes; Characterization/Standardization)
__ Tape 12 PAINT (Management Options; Community Recycling; Industry Recycling; Vermont's Drop & Swap Day; Dakota County's Paint Can Crusher.
__ Tape 13 EDUCATION (Tools; Specific Examples: Non-Collection, Industry)
__ Tape 14 LANDFILLS & HHW (Landfill Excavations; Landfill Degredation; Landfill Contaminants & Their Detection)
__ Tape 15 HOW TO/LIABILITY (Funding/Costs; Liability; RFP's & Contracts)
__ Tape 16 HEAVY METALS (Lead, Cadmium, Mercury in MSW Stream; Lead Acid Batteries; Fluorescent Tubes)
__ Tape 17 HEAVY METALS (Continued) (MN's Household Battery Study; Collection Programs: Recycling Lead Acid & Dry Cell Batteries)
__ Tape 18 EDUCATION (Materials; Media: Uses, Access and Education of Media; Coalition Building; Educational Curricula)
__ Tape 19 HOW-TO/PERMITTING (New York; Massachusetts; California)
__ Tape 20 PERMANENT PROGRAM CASE STUDIES (King Cty, WA, Ingham Cty, MI; Florida Local Grant Program; Canada's Permanent Programs; San Francisco,CA
__ Tape 21 PERMANENT PROGRAM OVERVIEW (U.S. Programs, Standards for Permanent Facilities; San Bernardino, CA; Minnesota)
__ Tape 22 ONE-DAY COLLECTION CASE STUDIES (Raleigh, NC; Seattle, WA; Florida Amnesty Days)
__ Tape 23 ONE-DAY COLLECTION CASE STUDIES (Monroe Cty, NY; San Diego, CA; Industry Sponsored Programs; Orangeburg, SC)
__ Tape 24 HHW WITH CONDITIONALLY EXEMPT GENERATORS (RCRA Issues; Farms; Conditionally Exempt & Schools)

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Signature ______________

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